the OIL AND GAS JOURNAL

Planes, tanks and other motorized equipment are only as important as the destructive blows they can deliver the enemy—gasoline is the fuel that makes possible completion of their deadly missions . . . to help supply this vital fuel, Hanlon-Buchanan is supplying Butanes and Stabilized Natural Gasoline—STA-VOL-ENE the "Natural" known throughout the World.

Hanlon-Buchanan Inc

PIONEER NATURAL GASOLINE MANUFACTURER

EXPORT TERMINALS:
Goodhope, La. Corpus Christi, Tex.
Houston, Texas Texas City, Texas
Baytown, Texas Galena Park, Texas

TULSA, OKLAHOMA
NATIONAL BANK OF TULSA BUILDING
PHONE 2-1111 OR 328 WIRE OR WRITE P. O. BOX 1559
Cable Address STAVOLENE, Tulsa, U. S. A.

FOREIGN REPRESENTATIVE:
Banks, Williams & Co., Ltd.
4 Lloyd's Ave.
London, England

PRICE 20 CENTS AUGUST 5, 1943

SENTINELS THAT *Stop* EVAPORATION

ON "sentry duty" day and night, Hortonspheroids are helping to write today's stirring chapters in the annals of the petroleum industry.

Wartime demands have compelled refineries to produce quantities of 100-octane gasoline and other volatile petroleum products. In the storing and handling of these products it is essential to guard against volumetric loss and product deterioration. Hortonspheroids do this by providing storage that stops evaporation at its source.

Shown below are four Hortonspheroids at a large refinery. They were designed for 15 lbs. per sq. in. pressure and hold 25,000 bbls. each.

CHICAGO BRIDGE & IRON COMPANY

Birmingham, Chicago, Cleveland, Tulsa, Houston, New York, Philadelphia, San Francisco, Washington

HORTONSPHEROIDS

223081

CALIFORNIA
STATE

Rigging . . . for the bridge of ships

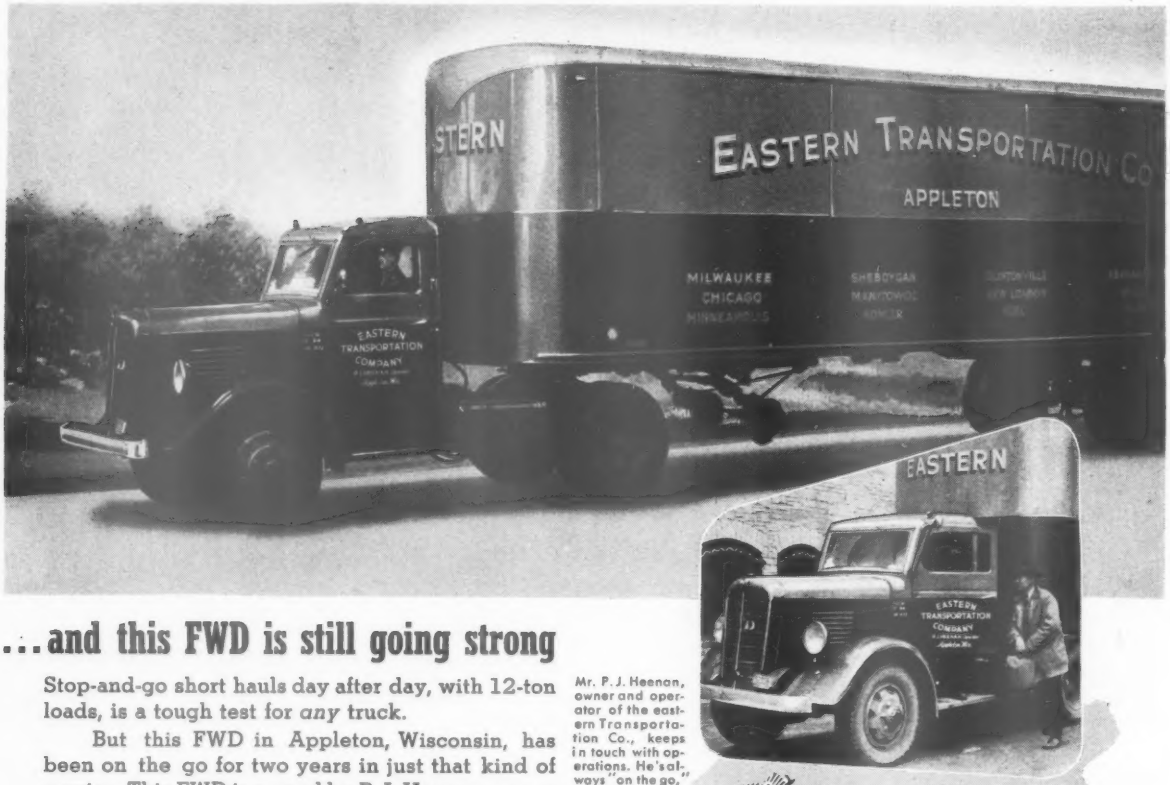
Hundreds of tons, millions of feet, of Bethlehem Wire Rope are being used in rigging cargo ships for American convoys bound to Britain and the Mediterranean and to the Solomons.

Bethlehem Wire Rope is furnished in every size, grade and construction used on both merchant ships and warships. We are supplying everything from guys and lashings to towing hawsers, elevator cables and hard-running winch ropes. Bethlehem's wire-rope mill is working 168 hours a week to turn out the tremendous quantities of wire rope needed for the bridge of ships, as well as to meet hundreds of pressing war-production needs on the home front.

★ ★ ★ ★ ★ ★ ★ BETHLEHEM STEEL ★ ★ ★ ★ ★ ★

Full Loads . . . Short Hauls

Two Years' Driving with No Time Out



. . . and this FWD is still going strong

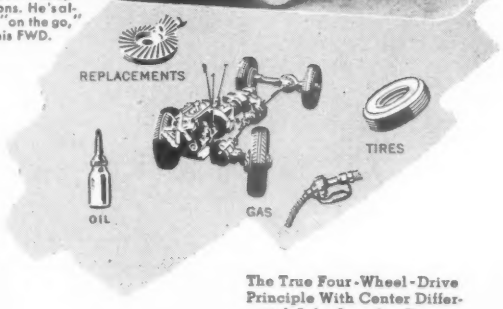
Stop-and-go short hauls day after day, with 12-ton loads, is a tough test for *any* truck.

But this FWD in Appleton, Wisconsin, has been on the go for two years in just that kind of service. This FWD is owned by P. J. Heenan, owner and operator of the Eastern Transportation Co. "Not since we purchased this truck have we been tied up or lost time," writes Mr. Heenan.

Mr. Heenan purchased this FWD truck (a T-26 tractor) in August, 1941. It is used daily on Eastern's Manitowoc-Appleton run. In over 50,000 miles, the gasoline economy on this short haul averaged 4.6 to 5 miles per gallon, with loads up to 12 tons. . . Extra ruggedness and dependability are built into FWD trucks. Owners know that FWD's never become "orphans" — that progressive interchangeability of vital parts keeps FWD's in service far beyond normal expectancy.

The full-powered traction of four driving wheels is vital for today's transportation tasks. See your FWD branch or dealer and get the whole story.

Mr. P. J. Heenan, owner and operator of the eastern Transportation Co., keeps in touch with operations. He's always "on the go," like his FWD.



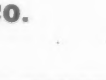
The True Four-Wheel-Drive Principle With Center Differential Asks Less In: Tires — Gas — Oil — Replacements

THE FOUR WHEEL DRIVE AUTO CO.
CLINTONVILLE, WISCONSIN
Canadian Factory: Kitchener, Ontario

COMMERCIAL

CONSTRUCTION

UTILITIES


OIL FIELDS

MILITARY

FWD TRUCKS

IN EVERY FIELD WHERE TRUCK QUALITY IS PUT TO THE TEST — FWD's STAND UP!

New Wire Rope Simplification Plan Welcomed by Users

In this, the 16th of a series of informative articles on wire rope, the Macwhyte Wire Rope Company presents a condensed report of "Simplified Practice Recommendation R198-43." This sound and widely discussed plan was developed through the combined efforts of the National Bureau of Standards and engineers of the Wire Rope Industry. This timely information will be most useful to wire rope users.

* * *

For many years, both wire rope users and the wire rope industry have hoped for a reduction and simplification of the number of wire rope items. The wide variety of items was not only confusing to users, but also increased the problems of manufacturing and stocking so many different ropes.

Shortly after Pearl Harbor, it became obvious that both a steel and a manpower shortage would develop. Since reduction and simplification of wire ropes would help save steel, conserve time and manpower, and expedite deliveries, the Bureau of Standards worked out a plan described in "Wire Rope Simplified Practice Recommendation R198-43." Copies may be obtained from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. Price 10 cents. This plan is one which consumers, distributors and manufacturers have long wanted; not only as a wartime conservation measure, but as a basis for improved service afterwards.

What, briefly, is this simplification plan? How does it affect you?

The wire rope simplification program is concerned primarily with a reduction in the number of different sizes, varieties, and grades of wire rope produced for stock purposes.

Wire rope engineers working with the Bureau of Standards found that 20 wire rope constructions cover the vast majority of wire rope tonnage.

By adhering to these constructions, the number of ropes are reduced from 973 to 643, or 33.9%.

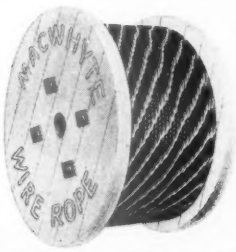
How Users Benefit

By reducing the number of "special" ropes, more attention can be paid to faster production of those ropes most widely used. Better service and delivery can be made to users as larger stocks will be available due to greater production of fewer items.

Your Cooperation

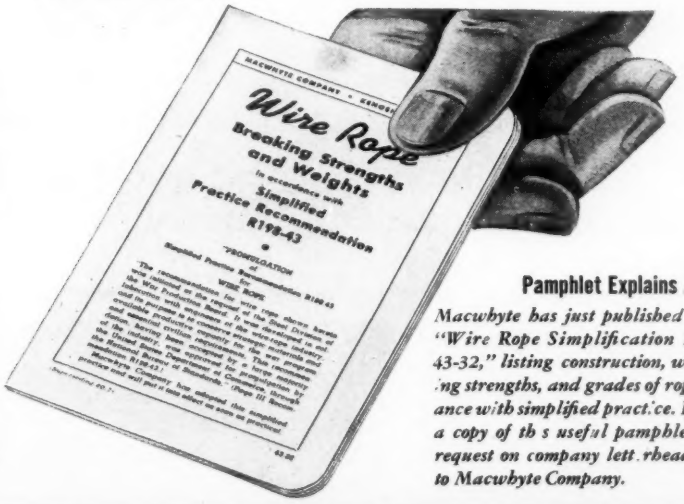
Hundreds of manufacturers, distributors, users, and all wire rope manufacturers have indicated in writing, their acceptance of this simplified wire rope practice which will result in increased efficiency for manufacturers, distributors and users . . . not only now but also in the post-war period.

Wire rope users can aid materially in the success of this program by voluntarily confining their specifications and orders, so far as possible, to the items recommended by the simplified practice program.



MACWHYTE WIRE ROPES

—the correct rope for your equipment.
PREformed and Internally Lubricated.



Pamphlet Explains All

Macwhyte has just published a pamphlet, "Wire Rope Simplification Practice No. 43-32," listing construction, weights, breaking strengths, and grades of ropes in accordance with simplified practice. If you care for a copy of this useful pamphlet, write your request on company letterhead and send it to Macwhyte Company.

MACWHYTE COMPANY

WIRE ROPE

2916 FOURTEENTH AVENUE KENOSHA, WISCONSIN

Mill Depots: New York · Pittsburgh · Chicago · Fort Worth · Portland · Seattle · San Francisco. Distributors throughout the U. S. A.
Manufacturers of MACWHYTE PREformed and Internally Lubricated Wire Rope MONARCH WHYTE STRAND Wire Rope
MACWHYTE Special Traction Elevator Rope MACWHYTE ATLAS Braided Wire Rope Slings MACWHYTE Aircraft Cables and Tie-Rods

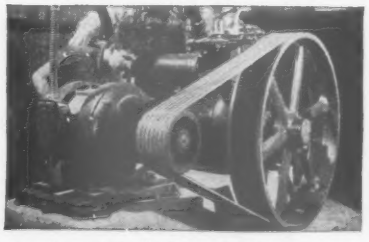
Good Team Great Team

ALLIS-CHALMERS MOTORS AND

☛ **Using high-speed motors with Allis-Chalmers Texrope Drives and single-speed motors with Allis-Chalmers Vari-Pitch Sheaves and Speed Changers has always been good practise.** ***In time of war it's a vital practise!***

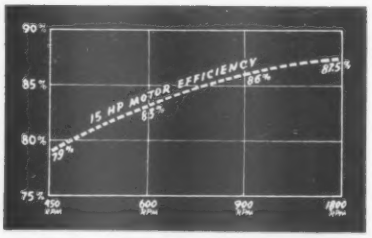
☛ **Such combinations give sharply higher efficiencies—at lower cost in man-hours, money and materials!**

☛ **Allis-Chalmers, only builder of *both* motors and V-belt drives, offers invaluable know-how in teaming them up.**



1 In most applications, an 1800 rpm motor with Texrope Drive will ably do the job of a lower-speed, direct-connected motor —at lower cost in money *and materials!*

2 When you buy an 1800 rpm instead of 450 rpm 15 hp squirrel-cage motor, for example, 600 lb are saved. And *you* save well over $200 — with drive figured in!



3 Note that efficiency rises from 79% for the 450 rpm motor to 87.5% for the 1800 rpm motor. The 1800 rpm motor saves you over 30 kw/24 hr. day.

WE WORK FOR VICTORY — WE PLAN FOR PEACE

ALLIS-

in Peace . . . in Wartime!

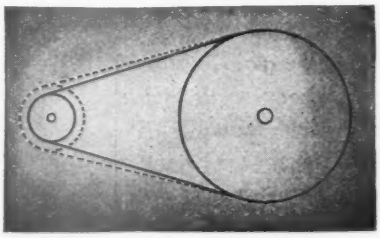
TEXROPE DRIVES

IT'S TIME to take a *fresh* look at motor buying! See below how much you can save with high- and single-speed motors made flexible by Texrope Drives.

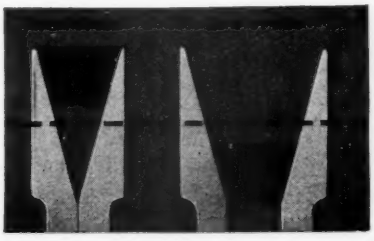
Allis-Chalmers, builder of Lo-Maintenance Motors, originated the multiple V-belt drive and Vari-Pitch Sheaves . . . is the only manufacturer building *both* motors and V-belt drives. You benefit when you ask for — and get — the *right* combination of Lo-Maintenance Motor and Texrope Drive!

Call on your nearby Allis-Chalmers district office for facts, figures and advice — or write direct to ALLIS-CHALMERS MFG. CO., Milwaukee 1, Wis.

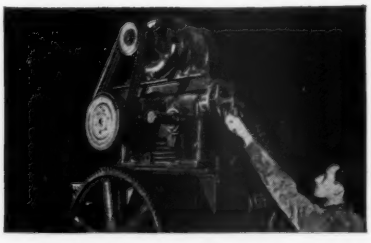
A 1627



4 Infrequently needed speed changes can be had by changing from one size motor sheave to another. Juggling *complete* drives, range is 1:1 to 7:1.



5 With the Allis-Chalmers Vari-Pitch Sheave, you can increase or decrease speed by adjusting sheave diameter . . . obtaining an *unbroken* series of speeds!



6 Allis-Chalmers Vari-Pitch Speed Changer gives you infinite changes at the turn of a wheel — within 3.75 to 1. It's compact, flexible, *efficient!*

CHALMERS

LO-MAINTENANCE MOTORS
TEXROPE DRIVES

CONTINUE TO "GUARD THOSE VALVES"

Since such tremendous tonnage must be carried to forces around the globe, it is easy to understand why Reading-Pratt & Cady for so long have advised you to "guard those valves." Ships are a maze of valves. ★ Strides toward victory should not encourage the thought that the transport of matériel for fighting Americans be put in jeopardy—so that we at home might have more. Now is the time to put into war every ounce of drive we can muster. Continue to guard your valves.

READING-PRATT & CADY

MANUFACTURERS OF
READING CAST STEEL VALVES AND FITTINGS • PRATT & CADY BRASS AND IRON VALVES
D'ESTE VALVE AND ENGINEERING SPECIALTIES

Reading, Pa., Atlanta, Boston, Chicago, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Portland

A DIVISION OF AMERICAN CHAIN & CABLE COMPANY, Inc., BRIDGEPORT, CONNECTICUT

FLUPACO'S *Pumping Analysis*

SAVES REPAIR TIME • CUTS OPERATING COSTS • INSURES LONGER LIFE

Flupaco Pump Service Men are ready to analyze these "pumping factors" in your wells...

- Depth of well
- Depth of pump setting
- Well productivity
- Sand and/or gas conditions
- Water (type and %)
- Total fluid production
- Bore of pump (plunger diameter)
- Tubing size or combinations
- Rod size and % of each if combination
- Gravity of oil
- Length of polished rod and pump stroke
- Number of pump strokes per minute
- Corrosion and abrasion factors
- Pumping time, full or part

DISCUSS your pumping requirements with Flupaco service men. Get their helpful suggestions on... the right size of pump for your well... proper installation, pump fit and bore... recommended strokes and speeds ...correct valve spacing and plunger fit. This "PLUS" service can be an invaluable aid in your wartime maintenance program.

Flupaco Pumps with hardened and honed one-piece barrel construction are the result of a long range pump development program. These pumps are so simple, so long wearing, they outwear many others as much as 5 to 1 under the toughest pumping conditions. And there's a Flupaco Pump for every production need. Call our field service man for complete information.

THESE FLUPACOS WI[LL] [MEE]T YOUR PUMPING [NEE]DS

GROOVE SEAL PUMPS
"VOLUME PRODUCER"—For large wells.
"PRODUCER"—For medium wells.
"PETROL A"—For shallow production.

"IMPROVED INSERT" PUMPS
The quality pump of one-piece barrel construction. Extra wall thickness assures unusually long life and permits several re-honing jobs. Available in all popular sizes and lengths.

FLUID PACKED PUMPS (3-Tube Type)
For troublesome wells...especially where sand conditions prevail.
"POSITIVE PULL TYPE"—Economical for normal pumping conditions.
"REMOVABLE (KEY) TYPE"—Standing valve and seat can be removed when pulling traveling tubes.
"MARGINAL TYPE"—For small volume wells and shallow depth.

TUBING LINER PUMPS
Large volume producer in various lengths and three diameters.

"FLUCUP" PUMPS
Low cost pumps which give highly efficient production under less severe conditions.

"FLU-RING" PUMPS
Low cost pumps for a wide range of conditions.

FLUID PACKED PUMP COMPANY
MAIN PLANT: LOS NIETOS, CALIF.
HUNT BLDG., TULSA, OKLA.; 6006 NAVIGATION BLVD., HOUSTON, TEXAS; TEXAS BK. BLDG., DALLAS, TEXAS; NAT'L SUP. CO. STORES, ILLINOIS FIELDS
WORLD'S LARGEST EXCLUSIVE OIL WELL PUMP MANUFACTURERS

Backing Up the "Flaming Bomb"

The oldest of the present insignia in the U. S. Army is the shell and flame of the Ordnance Department, now commonly known as the Flaming Bomb. It was adopted in 1832 to be worn in the gold embroidery on the skirts of the long coats of officers of both Artillery and Ordnance. In 1851 it was removed from the Artillery and confined to Ordnance. Originally, the device came from the British where under the name "grenade" it was the badge of the Royal Engineers and the Grenadier Guards.

O.E.M. Photo

Standing squarely behind the men who wear the "Flaming Bomb" insignia—backing up the Ordnance Department of the U. S. Army, is American Industry.

Never before in the history of wars have weapons of such deadly accuracy and munitions of such devastating power been produced as those supplied our Armies and Allies.

Production of such an avalanche of arms requires billions of cubic feet of gas, millions of gallons of water, and enormous quantities of oil and chemicals.

Dresser ready-to-use Couplings speed the installation of pipe lines to transport and distribute this gas, water, and other materials. Dresser Repair Clamps and Sleeves maintain and repair these new and older lines.

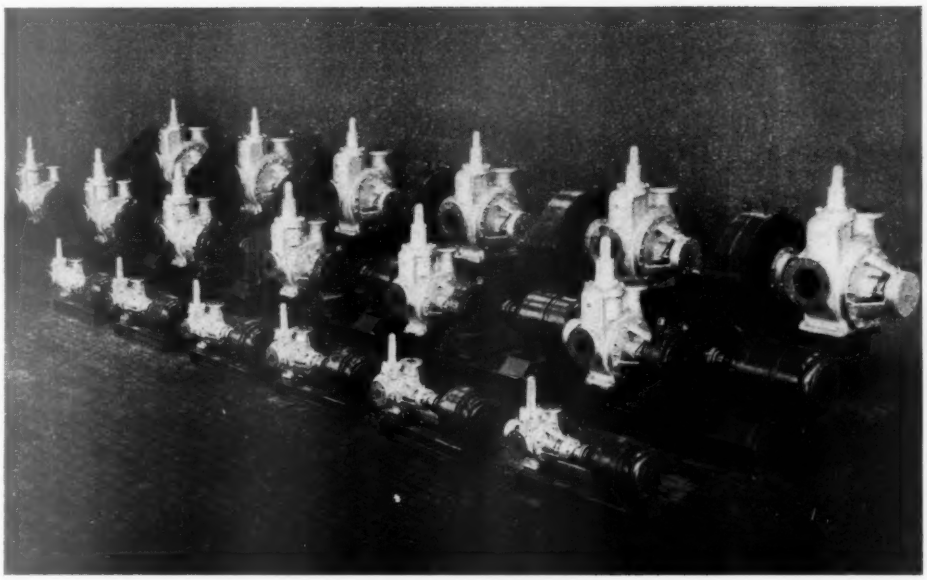
A 'round-the-clock schedule at Dresser helps Ordnance "over here" to supply the best equipment to our troops "over there."

Dresser Manufacturing Co., Bradford, Pa.

DRESSER

Pipe Couplings, Repair Devices, Rings, Wheels, and Forgings for War

TRANSIT
SOLID BRONZE TANKER PUMPS



Nearly 100% employee participation in pay-roll deduction plan for War Bonds.

Six 500, six 200, and six 25 TRANSIT Rotary Marine Pumps ready for shipment on one order.

These pumps all have solid bronze liquid ends, and structural steel bases. The 200 and 500 have TRANSIT Geared Speed Reduction units. The 200 and 25 show motor drives. The 500 will be driven by steam turbines.

Six 25 is used for motor well drain; size 200 for engine room bilge, and size 500 for general service and cargo stripping.

Ask for our new bulletin 705 on TRANSIT Marine Rotary Pumps.

NATIONAL TRANSIT PUMP AND MACHINE CO.

Home Office and Works OIL CITY, PENNA.

Mid-Continent Warehouse 318 East Archer Street TULSA, OKLA.

NEW YORK - PHILADELPHIA - CHICAGO - CLEVELAND - PITTSBURGH - LOS ANGELES - HOUSTON - TULSA

Allied Supply Company, 2068 East 37th Street, Los Angeles, California

The Lang Company 267 West First South St., Salt Lake City, Utah

MEMBER

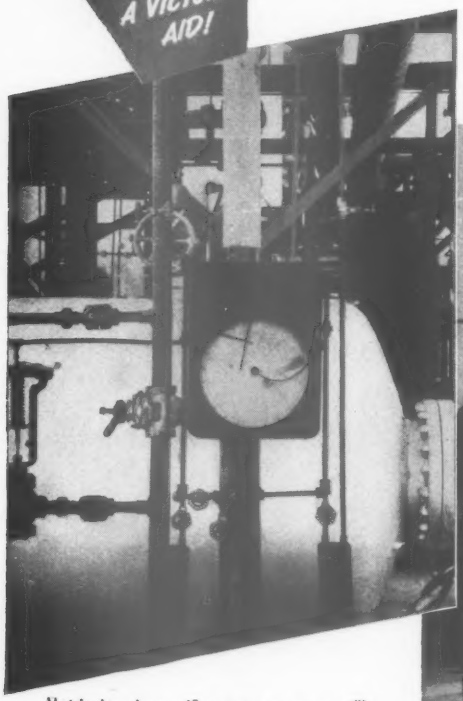
Eugene V. Winter Co., 15 Drumm Street San Francisco, California

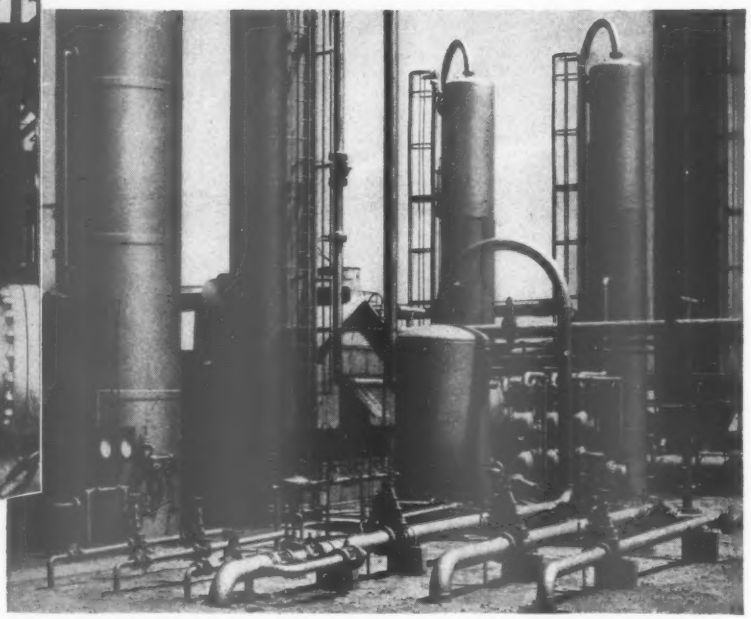
Standard Supply and Hardware Company 822-838 Tchoupitoulas St., New Orleans, Louisiana

Reeves & Skinner Machinery Co. 2211 Olive Street, St. Louis, Missouri

SIMPLIFICATION ★ A VICTORY AID!

Being Right the First Time!





Metric-American orifice meter on re-run still.

IN PETRO-CHEMICAL PROGRESS, pilot plant and new technology can take full advantage of proven instrument performance. Where time is precious, and new equipment at a premium, trial-and-error methods in the selection of instruments have short shrift.

During a century of steady technological advance, American Meter Company measurement instruments have pioneered first in the gas industry and then in the petroleum industry. *The long sustained accuracy of its present instruments is equal to the smallest visible reading on test gage or chart.*

Among the factors responsible for low-cost accuracy and maintenance, none has been more important than the simplicity demanded by practical engineering.

Simplified design and construction make operation dependable . . . adjustment speedy . . . cleaning easy.

Are you familiar with all the types available in Metric-American orifice meters, flowmeters and control instruments? Catalogs upon request.

METRIC METAL WORKS • ERIE, PA.

AMERICAN METER COMPANY

INCORPORATED (ESTABLISHED 1836)

1934

The OIL AND GAS JOURNAL

published weekly by the

PETROLEUM PUBLISHING COMPANY

211 S. CHEYENNE ST., TULSA, OKLAHOMA

Subscription price, United States and foreign, 1 year, $6.00; 2 years, $10.00; 3 years, $12.00; 5 years, $15.00. Single copies, 20 cents. Back copies, when over a year old, 50 cents. Entered as second-class mail matter at Tulsa, Okla., under Act of March 3, 1879. Copyright 1943, by The Petroleum Publishing Co.

Vol. 42, No. 13 August 5, 1943

P. C. LAUINGER, *President* — C. O. WILLSON, *Editor*

S. H. ROURKE, *Business Manager* — H. STANLEY NORMAN, *News Editor*

R. C. MAC DOUGALL, *Circulation Manager* — ARCH L. FOSTER, *Refinery Editor*

W. L. NELSON, *Technical Editor* — W. V. HOWARD, Ph.D., *Field Editor*

HARRY F. SIMONS, *Production Engineering Editor*

Associate Editors

LYNN M. NICHOLS — PAUL REED

NEIL WILLIAMS

District Editors

JAMES McINTYRE, Tulsa 1, *211 S. Cheyenne Ave.* — CARL HOOT, Tulsa 1, *211 S. Cheyenne Ave.*

THOMAS F. SMILEY, Houston 2, *Sterling Bldg.* — E. H. SHORT, JR., Houston 2, *Sterling Bldg.*

L. P. STOCKMAN, Los Angeles 14, *Union Oil Bldg.* — HARRY F. SIMONS, Fort Worth 2, *Petroleum Bldg.*

HENRY D. RALPH, Washington 4, *Natl. Press Bldg.* — TOLBERT R. INGRAM, Denver 2, *State Office Bldg.*

O. C. PRESSPRICH, Saginaw, *News Bldg.* — J. P. O'DONNELL, New York 17, *415 Lexington Ave.*

VICTOR LAURISTON, Chatham, Ont., *35 Stanley Ave.* — A. C. MacINTYRE, Oil City, *Derrick Bldg.*

Advertising

E. KLAPPENBACH, *Vice President*

KENNETH J. LANGLEY, *Eastern Manager*, New York 17, *415 Lexington Ave.* — HOWARD MARKT, *Cleveland Manager*, Cleveland 14, *Leader Bldg.*

C. R. FARMER, *Chicago Manager*, Chicago 2, *105 W. Madison* — J. HOWARD TINKHAM, *California Manager*, Los Angeles 15, *1406 S. Grand Ave.*

WAYNE RIVES, *Gulf Coast Manager*, Houston 2, *Sterling Bldg.* — A. J. CHAMBERS, Twickenham (Middlesex) England, *72 Cole Park Road*

MITCHELL TUCKER, *Manager, Research Dept.*, Tulsa 1, *211 S. Cheyenne Ave.* — JOHN D. REILLY, *Production Manager*, Tulsa 1, *211 S. Cheyenne Ave.*

Member
Audit Bureau of Circulations
Associated Business Papers

Table of Contents

NEWS DEVELOPMENTS

Attrition Blows Aimed at Axis Oil Supplies ... 14
Expansion of Facilities Aggravates Manpower Shortage ... 16
Testimony on West Texas to Conclude Hearings ... 18
Government Seeking Data for Synthetic-Oil Plant ... 19
Rationing-Equalization Plan May Be Disclosed This Week ... 19
Bayou Pipe Line's Contribution Celebrated ... 20
Another Rise Anticipated in Domestic Crude Demand ... 22
Drake Well Board Outlines Development Program ... 22
Spacing Patterns Set for Three Illinois-Indiana Fields ... 24
Shell Group Reports on N.E.I. Destruction ... 24
Patriotic Idea Developed into Vital Link in Oil Supply ... 25
Deaths ... 26

Trends ... 13
This Week ... 15
Editorial ... 21
Federal Order Digest ... 23
Natural-Gas News ... 61
Natural-Gasoline News ... 61
Refining News ... 62
Pipe-Line News ... 64

ENGINEERING—OPERATING

Problems Involved in Conventional Refining of Sour Crudes ... 27
Rapid Extraction Methods in Fields Producing Much Water ... 39
Oil-Well Pumping Practices—No. 6 ... 49

Plant Practices ... 36
Operating Ideas ... 45
Progress in Metals ... 53
Eng. Fundamentals ... 55
Cost Engineering ... 57
Journalog ... 59

EXPLORATION AND DRILLING

Week's Highlights ... 67
Completions in All Fields ... 67
Daily Average Production for Week ... 68
Reports by Areas Start on Page ... 68

ADDITIONAL FEATURES

Drilling Contractors ... 78
Personals ... 80
Market Developments ... 82
Refinery Prices ... 83
Tank-Wagon Prices ... 83
Equipment Progress ... 84
Classified Advertising ... 85
Calendar of Events ... 88
Journalisms ... 88
Index to Advertisers ... 88

Truly Universal

ALL catalytic and other petroleum refining processes, research and know-how are made available to every refiner and engineer contractor.

A licensee chooses his own contractor, U.O.P. works with both.

Experts train and educate the licensee's personnel in the new technique.

Technologists maintain continuous plant contacts to impart the latest techniques for the promotion of refining efficiency, progress, and safety.

Universal licensees build for the future.

U.O.P. is not a contractor, manufacturer or seller of equipment—but a pioneer in petroleum research and technology.

CATALYTIC CRACKING	HYDROFORMING
REFORMING	DEHYDROGENATION
HYDROGENATION	POLYMERIZATION
ALKYLATION	UNISOL TREATING
ISOMERIZATION	RETREATING
THERMAL CRACKING	SWEETENING
U.O.P. CATALYSTS	U.O.P. INHIBITORS

COMBINATIONS, MODIFICATIONS AND NEW APPLICATIONS OF ALL THESE PROCESSES

NEW PROCESSES IN THE MAKING

OIL IS AMMUNITION—USE IT WISELY

Universal Oil Products Co.

Chicago 4, Ill., U. S. A.

CARE FOR YOUR CAR FOR YOUR COUNTRY

Petroleum Process Pioneers

For All Refiners

The Refiners Institute of Petroleum Technology

the OIL AND GAS JOURNAL

Trends

Crude-Oil Production By States — Page 68

CRUDE PRODUCTION 4,121,175 bbl. daily average—up 4,605 bbl. One year ago 3,392,615 bbl.

CRUDE STOCKS 237,279,000 bbl. as of July 24—down 161,000 bbl. One year ago 249,262,000 bbl.

GASOLINE STOCKS 75,714,000 bbl. as of July 24—down 851,000 bbl. One year ago 80,762,000 bbl.

RESIDUAL FUEL-OIL STOCKS 66,992,000 bbl. as of July 24—down 25,000. One year ago 77,512,000 bbl.

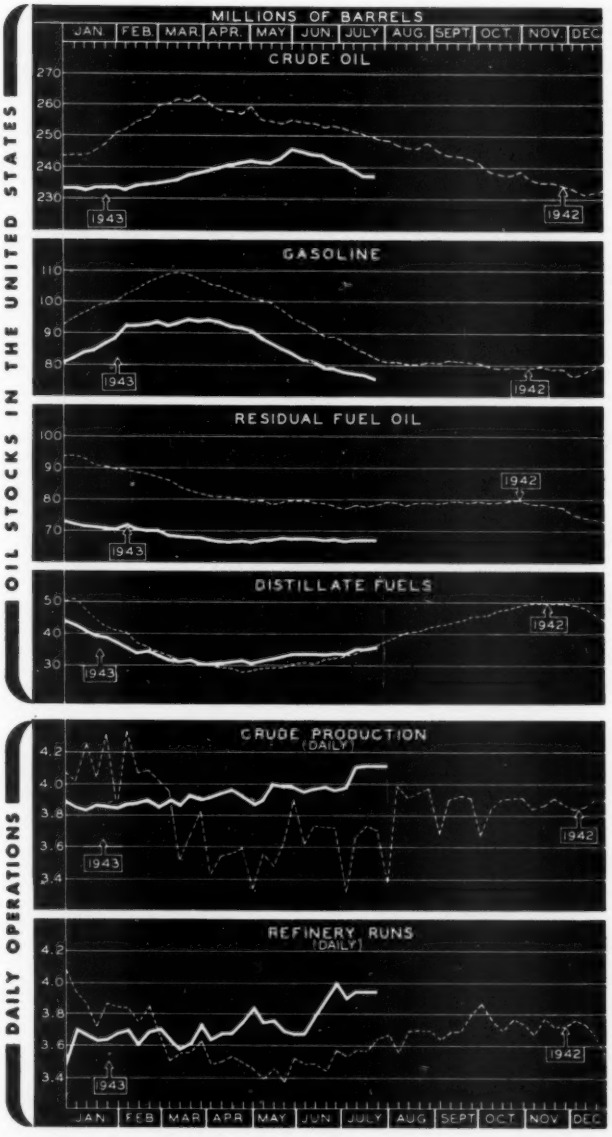
GAS OIL AND DISTILLATES 35,889,000 bbl. as of July 24—up 853,000. One year ago 36,046,000 bbl.

REFINERY RUNS 3,973,000 bbl. daily week ended July 24—up 11,000. One year ago 3,640,000 bbl.

THE Bureau of Mines forecast of Saturday covering August operations and the earlier PAW recommendations, which are in substantial agreement with those of the bureau as to supply and demand, have been termed a "leveling off" plan in which attempts will be made to end the operating discrepancies between areas apparent since this country's entry into the war. The details of the program of making more gasoline available to civilians in District 1 by increasing shipments from Districts 2 and 3 are expected daily. This program is based on the steady expansion in the overland movement of crude oil and products to District 1 with the contention in eastern oil circles that there shortly will be no legitimate excuse for any differentiation among the districts in the quantities of products made available to consumers.

IN the absence of a definite operating and shipping program there are mixed reactions among District 2 and 3 refiners and shippers regarding the plan which, as now projected, includes reductions in the gasoline available to consumers within those districts. In District 2 one refinery operator in close touch with general conditions says that with few exceptions refiners are behind in their August gasoline shipments to regular customers, most of whom are located within the district. He explains that in most cases these refiners do not see how they are going to supply the early demands in that district for furnace oils. Those refinery operators whose runs to stills are less than the allocations are looking for more crude oil as the most practical solution for their operating difficulties. In this connection several District 2 refiners are giving serious consideration to the possibilities of tank-car shipments of sour crude from West Texas and New Mexico fields over the remainder of the year. This involves adjustments in their processing operations.

IN District 3, where refiners have been given permission to expand their operations providing they can secure the crude from West Texas, New Mexico and Southwest Texas fields, a substantial expansion in plant operations is assured for August if transportation facilities are provided, including those required for the rapidly expanding production of war products. In that area considerable stress is placed on coastwise tanker conditions in the discussions as to the maximum crude-oil and product shipments possible to District 1.



The Ploesti refining, producing and storage area in Rumania, heart of Germany's natural petroleum supply, was severely damaged early this week in a low-level raid by American bombers

Attrition Blows Aimed at Axis Oil Supplies

MORE than 62 per cent of Rumania's crude-oil refining capacity, including three of the country's largest plants, are concentrated in the Ploesti area which was pasted August 1 with 3,000 tons of bombs dropped by AAF bombers operating at the 500-ft. level.

The high concentration of manufacturing capacity at Ploesti, adjacent to the producing fields, made the Rumanian oil center one of the most inviting targets in the Allied campaign to reduce Germany's petroleum supply. The largest and most complete refinery in Rumania is that of the Astra Romana Co., a subsidiary of the Royal Dutch-Shell group before the German occupation. The plant had a daily crude-oil capacity of 43,000 bbl. when last operating details were reported in 1939. It is logical to assume that German and Rumanian technicians have maintained the plant at its prewar efficiency and probably have installed new equipment and adopted processes for the maximum production of aviation gasoline and lubricating oil.

Full details of the bombing results were not released last week by the Army although military communiques from Cairo, Egypt, said that damage to the refining facilities was severe. Rumanian refineries have been Hitler's chief suppliers of lubricating oil and have contributed heavily to the striking power of the German air force and mechanized divisions.

This week's bombing of Rumanian refineries is the third recorded Allied aerial attack on petroleum facilities of that country. American forces previously bombed field installations and plant facilities in the Ploesti area in a comparatively small attack from bases in Egypt. Several months ago Soviet Russian airmen attacked petroleum installations and reported setting a large number of fires.

There were 175 American Liberators in the force which attacked Ploesti August 1. Twenty of the raiding planes failed to return, indicating the hazards of that 2,400-mile round-trip assignment. More than 50 defending fighters were shot down in the operations over Rumania. The American planes operated from a base in North Africa and crossed several Axis satellite countries to reach their objective.

Latest estimates place Rumania's current oil production at approximately 104,400 bbl. daily, a decline of about 2,000 bbl. from the daily average output a year ago. No recent data are available on what percentage of Rumania's petroleum production is going into direct military consumption. Estimates earlier in the war were that Germany was receiving approximately 70 per cent of Rumania's production. If previous relations continue, Germany may be re-

(Continued on Page 20)

	Capacity, bbl. daily	
Ploesti area refineries:	Crude	Cracking
Astra Romana S.A. (Shell)	43,000	13,000
Colombia Societe Franco-Rumanine de Petrol	10,000	5,000
Concordia Societe Anonyme pour l'Industrie due Petrole	29,000	4,200
Dacia Romano Petroleum Syndicate	5,000	0
Neo Petrole (Fratia)	3,000	0
I. Grigorescue S.A.	1,200	0
"Petrol Block," S.A., Romana	8,500	4,000
"Photogen" Rafineria de Petrol (Socony-Vacuum)	3,500	0
Romano-Belgiana de Petrol, S.A.	5,000	0
"Unirea" S.A. Romanada Petrole	23,000	3,500
Total Ploesti area	131,200	29,700
Rest of country	80,100	17,800
Total Rumania	211,300	47,500

THIS WEEK

REFINING—All stops were pulled wide open by PAW's Refining Division for August operations. . . . Gulf Coast plants in condition to operate instructed to run at maximum capacity. . . . Availability of crude only limitation on eastern refineries. . . . Eleven Great Lakes plants authorized to run at capacity BUT they can't interfere with regular crude supplies to other refiners and MUST earmark increased production for shipment to eastern states. . . . ¶Strong appeal made to Gulf Coast and eastern plants to make all possible 80-octane, general-purpose gasoline without reducing yields of war products. . . .

PRODUCTION—Bureau of Mines forecasts domestic crude demand this month at 4,151,600 bbl. daily. . . . ¶Louisiana checking into excess producing capacity of all fields. . . . ¶Texas hearings show reserve producing capacity of 400,000 to 500,000 bbl. daily. . . . Railroad Commissioner Thompson anticipates PAW request for 100,000 additional barrels daily from Texas in September. . . . ¶Specific spacing patterns issued for three Illinois and Indiana fields, by District 2 PAW office. . . .

TRANSPORTATION—Rail shipments to East Coast decline to 957,938 bbl. daily, showing continued effect of diverting tank cars from Norris City, Ill., to more distant sources of supply. . . . ¶Products line from Gulf Coast to Norris City about half finished, scheduled to start moving oil September 1. . . . ¶Crude nearing eastern terminals of WEP 24-in. system while contractors complete distribution arteries to Pennsylvania, New Jersey, New York refineries. . . . ¶Improved earnings by Atlantic Refining Co., and Sun Oil Co., reflect recent improvement in transportation. . . . ¶Bureau of Mines speculates on greater use of tankers in domestic coastwise and Caribbean service, avoiding, however, reference to any tangible revision in marine movement of oil. . . .

SUPPLIES—Shortages of gasoline reach critical stage in local Midwest territories. . . . ¶Coastal refiners, particularly those handicapped by storm damage, facing sharp reduction in storage already critically low. . . . ¶East Coast index inches up, standing at 35.2 per cent of normal. . . . ¶Products pinched off at Gulf Coast until refinery repairs are made may be replaced temporarily by greater movement from Mid-Continent. . . .

RATIONING—Disclosure of specific administration plan for "equalizing" rationing in Districts 1, 2 and 3 may come in a few days. . . . Middle western congressmen intensify opposition to interior cut. . . . Administrator Ickes agrees to confer this week at Chicago with informal delegation of inland representatives. . . . Offer not yet accepted. . . .

CONSUMPTION—Second quarter gasoline consumption within 1 per cent of 1942 demand. . . . ¶Texas comptroller shows about 40 per cent of current gasoline consumption there going to tax-free federal government agencies. . . . Clarifies some aspects of sharp increase in consumption reported in recent months. . . . Some critics, including OPA, had blamed local Texas rationing boards for lax administration of regulations. . . . In June, Texas collected taxes on 119,626,772 gal., while 113,004,642 went to federal consumers. . . .

Amphibious "ducks" such as this standing in front of an American fighter plane at a Sicilian air field bring aviation-gasoline and lubricating oils from an invasion ship, over the beaches and to the planes awaiting refueling before starting another sortie over the battle zone

Press Association Inc.

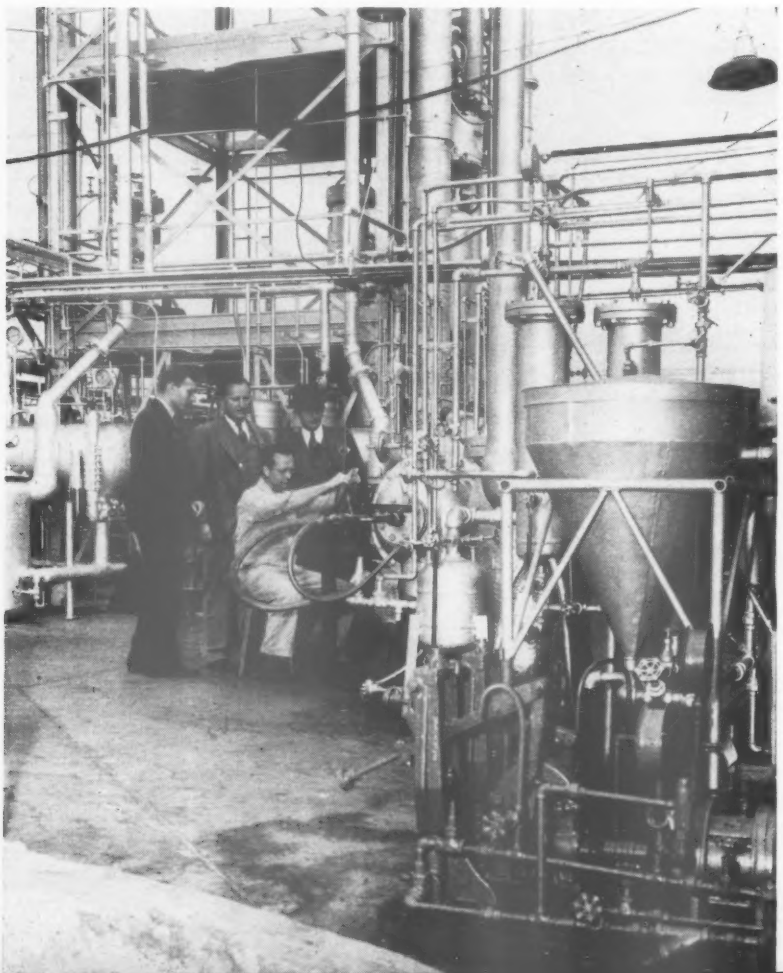
Expansion of Refining Facilities Aggravates Manpower Shortage in California

by L. P. Stockman

This report on the critical manpower situation in California petroleum operations includes a summary of the training program and replacement schedules. Replacements for men subject to military service and the proper scheduling of training programs are becoming increasingly important as the available manpower diminishes. Other producing and refining centers are adopting many of the practices now in operation in California.

LOS ANGELES, Calif. — The California oil industry's war obligations are complicated by a critical manpower shortage that has consistently grown more acute. This manpower shortage is further aggravated by the tremendous expansion that has taken place during the past year in California refining facilities and the erection of aviation-gasoline and synthetic-rubber plants that require skilled workers and technical men in rapidly growing numbers. A further major expansion of refining facilities is under way. Refineries producing these essential products are finding it difficult to secure experienced men to staff new installations and are therefore confronted with the necessity of training new men as quickly as possible to offset the drain to the services and to replace men attracted to other war industries. The need for technical men is being partly met by transferring petroleum engineers and development engineers from the drilling and production departments to the refining or manufacturing departments.

Skilled technicians are required for many operations. Here a group is watching results at one stage of operations at a synthetic-rubber pilot plant



Manpower shortages have developed somewhat slower in the drilling and production departments. The supply of employables has now reached the point where further transfers or the drafting of additional men for military service will seriously affect the production division. During the first year of Selective Service, the oil industry did not make many requests for deferments with the result that many men have been drafted. Numerous oil employes moved to other essential industries which were asking and receiving deferments. Consequently the number of oil-industry employes has been severely reduced and many companies reached the point months ago where reductions in manpower adversely affected the war effort of an essential industry.

Longer Work Week Ordered

The War Manpower Commission has ordered all business and industrial concerns in southern California, which includes the oil industry, to change over to a 48-hour week before August 22 in order to "help meet the manpower requirements of our armed forces, our expanding war production and our minimum civilian needs by full use of all available manpower." Los Angeles County is expected to be declared a critical labor-shortage area within the next few days as such a recommendation has been wired to Washington for approval.

Practically all field, refining and transportation divisions of the California oil industry have been on a 48-hour week for the past year, so this order will not alleviate current conditions. Office men have been on a 44-hour week since last May and it appears at this time that no reduction can be expected in manpower

requirements by the initiation of a 48-hour week for this class of employes.

In an effort to solve the manpower shortage, California oil companies have taken definite action such as the substitution of women for men and the use of physically handicapped persons, some being soldiers who have been discharged. Women have taken over men's jobs, with the exception of heavy work requiring lifting beyond the legal limit of 25 lb., with much more success than anticipated. At present over half the service-station employes in California are women and in some refineries approximately 25 per cent are women. Simplification and consolidation of jobs has also been an aid in partially solving the perplexing problem. The oil industry, unlike most other essential war industries, has few cost-plus contracts and operates largely under competitive bidding.

Job-Classification Manuals

The critical manpower shortage that has existed since May of last year has resulted in the compilation of a Manual of Job Specifications and Training Times for (1) drilling and production divisions, which includes geologists, petroleum engineers, natural-gasoline personnel, executives of the divisions and those working in this branch; (2) refining division; (3) transportation division, and (4) marketing division. These manuals, prepared by war manpower subcommittees of the general industry committee of District 5 with the aid and assistance of various oil-company committees, have been approved by PAW and the War Manpower Commission. Training times, as set forth in the manuals, represent the minimum time required to train a green man to the extent that he will be able to perform the tasks. The job titles will not be common to all and some may be unable, in certain instances, to identify a particular job in the manual as it is possible for an individual operator to have an exclusive job classification. The titles, descriptions and training times presented will for all practical purposes blanket the industry. If it is impossible to identify a job in the manual, it will be incumbent upon the individual operator to prepare his own job classification and to qualify an independent training schedule. Adoption of the manuals of job specifications and training times is the first step in a program designed to insure retention of critical men in the oil industry and to permit the release to the armed services of replaceable workers at the earliest possible time.

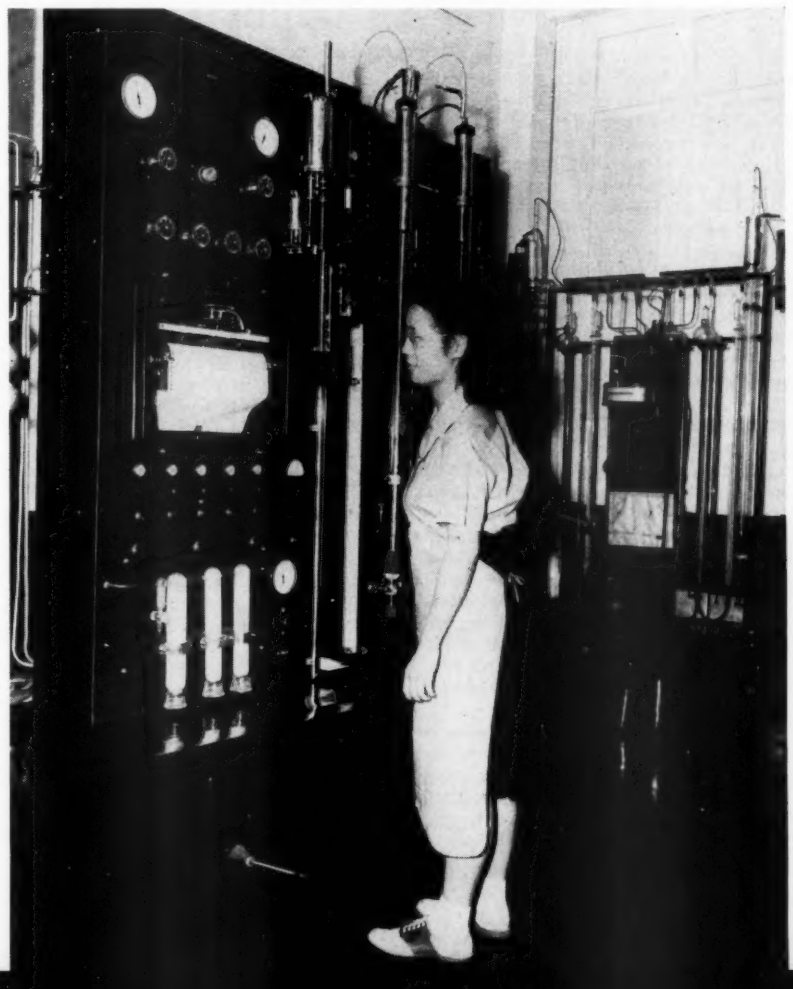
The second step in this program is the preparation and filing of replacement schedules in accordance with the job specifications and training times set forth in the manual covering the particular division involved so that Selective Service can make a determination of the essentiality of each individual. The training time shown in the various manuals may not necessarily represent the replacement time which will be approved by Selective Service when the replacement schedule is filed. Each company receives careful consideration and the personnel is classified according to the type of work performed, age, and availability for military service. Replacement time gives consideration to training time and also includes the factors of upgrading in an individual situation. The training time shown in the various manuals is, therefore, only a guide to replacement time and it is necessary to individually negotiate with Selective Service for replacement time that will be permitted for the various job classifications. Companies with only a few vulnerable men in their employ, but where a serious problem involving key personnel exists, should not attempt to secure deferments from local boards but will find it advantageous to prepare a replacement schedule and file the document with Los Angeles or Sacramento Selective Service headquarters. Replacement schedules can either be mailed or delivered in person, subject to appointment, but where a relatively large number of vulnerable men are involved it is advantageous to discuss the schedule orally.

The manual of job descriptions and training time for the producing and exploration division in addition to classifying the duties of various oil-industry workers contains an approved training schedule. This training is broken down into five subdivisions: A, over 2 years; B, over 1 year; C, 6 months to 1 year; D, 2 months to 6 months, and E under 2 months. The various jobs are classified according to the training time allotted.

Replacement Training Schedule

Drilling superintendents, rotary drillers, chief petroleum engineers, geologists and paleontologists are placed in Group A, which means the training time for replacements is more than 2 years. Derrickmen and pumpers are listed in Group B, but clerks and roustabouts are in Class E. Because of this, many drilling crews are short of roustabouts and in some cases drillers are being used as roustabouts. It means if one is a clerk or a roustabout and in good physical condition, he is as good as being in the Army now because it won't be long. Technical men are granted more consideration because Selective Service believes they can be of more use in their present positions.

Esther Wu, Chinese graduate chemist, operating a gas analyzer in a California refinery, freeing a man for military service



The manual for the refining and transportation divisions contain the same subdivisions in training time. In a refinery employing a superintendent, assistant superintendent, general foreman and two foremen, one of the two foremen would be placed in Subdivision A and the other foreman would be placed in Subdivision B. The same plan is followed in the distillation and cracking jobs where three stillmen and a stillman helper are employed. Stillmen 1 and 2 are given a rating of A, which calls for a training time over 2 years, but the third stillman is given a rating of B, and the stillman helper is placed in Group D which calls for a training time of from 2 to 6 months.

Allowances for Exceptions

The same general plan operates in all of the various divisions and the training time required has been determined by careful analysis. Where the work differs, allowance is made to take care of the exception and those who have been working with the WMC and Selective Service unanimously agree that both groups have been considerate and appreciate the difficulties under which the industry is laboring. In the final analysis these training times define the deferment time given an employe before he is called for Selective Service.

Currently, vulnerable classifications include all single men and married men without children, between the ages of 18 and 37 inclusive. Selective Service has indicated that only in unusual cases will it consider deferment for men under 25 years of age even though they may be technically trained. Tentatively, by September 1, 1943, companies will be obliged to prepare separate replacement schedules for married men, with children, between 18 and 37, inclusive. With the possibility of filing replacement schedules covering married men with children and owing to increased manpower requirements in the oil industry it is obvious that the oil industry's manpower problems will become more numerous in the months ahead. It is for this reason that PAW has taken a direct interest in the replacement-schedule program in District 5 as it has a community interest with the industry in the deferment of men on critical jobs who cannot be readily replaced and who will contribute more to the war effort in their present activities than in any other industry or in the armed services

California is faced with the problem of developing and producing the maximum amount of crude oil possible at the maximum efficient rate. The primary objective is the discovery of new crude-oil reserves and the secondary objective is to immediately increase or at least maintain current production from existing fields. Discoveries during the past 3 years have been of secondary importance from a production standpoint and consequently the state's crude-oil reserves have been severely reduced. This means that, while undertaking additional exploratory work, operators must concentrate their drilling activities in proved fields in order to develop additional production as quickly as possible. This drilling, however, is just putting another spigot in the barrel and does not increase future reserves. It is a tangible application of the economic law of diminishing returns.

It is generally conceded the demand for refined oil on the Pacific Coast will increase during the next several months simultaneous with a normal decline in crude-oil production. California is probably producing its maximum amount at present and it remains to be determined whether projected drilling during the remainder of the year will be able to maintain production at its present rate. Obviously this means that crude-oil reserves will be severely reduced during 1943 and that stocks of crude and refined oil will be substantially liquidated.

During June 1943 the latest data available, crude and refined-oil stocks were reduced 3,945,288 bbl. and there is every reason to expect that similar large withdrawals will be effected in July and August. Since January 1, 1942, crude and refined-oil stocks in California have been reduced 15,823,-294 bbl. of which 5,661,910 bbl. were withdrawn from stocks during the first 6 months of 1943.

In view of conditions, it is obvious that drilling and production crews must be maintained at their present levels.

Present conditions in the drilling and production divisions of the industry are the direct result of the laissez faire attitude taken by PAW and OPA while California operators were imploring quick action. The records of the case are quite clear and the year's delay is now being reflected in demand for production that cannot be met. The mass migration of field and refinery men to the shipyards took place during this delay and they have shown no desire to return to oil-field work. When spacing-modification orders were finally issued by PAW only skeleton crews remained.

Testimony on West Texas' Crude Capacity to Conclude Hearings

AUSTIN, Tex. — Hearings will be concluded next week in the Railroad Commission's current survey of reserve producing capacity in Texas fields. Testimony August 9 and 10 on West Texas fields will conclude the series of hearings which started late last month.

Witnesses heard so far indicate that Texas can produce 400,000 to 500,000 bbl. of oil daily above current rates of withdrawals.

The hearings on the maximum productive rates of sweet-crude pools of Southwest Texas and the Gulf Coast have been held in view of the rising demand for Texas crude from the Petroleum Administration for War. The August PAW order calls for 1,817,000 bbl. of oil daily.

It is anticipated by Commissioner Ernest Thompson that Texas will be called upon to produce an additional 100,000 bbl. in September.

On the basis of testimony already received, Commissioner Thompson estimates that production from sweet-crude fields can be raised at least 150,000 bbl. above the amount scheduled for August, while West Texas, which is still to be heard from, can be looked upon for another 250,000 bbl., thus raising the total possible increase in the state to 400,000 bbl.

The West Texas pool hearings were originally scheduled for August 2 and 4, but were postponed until August 9 and 10. The first day will be devoted to hearings on the pools in Pecos, Gaines, Ector and Andrews counties, while the second day will be given over to pools in Crane, Ward, Upton, Pecos, Cochran, Hockley, Yoakum, Terry and Gaines counties.

Present production in West Texas is approximately 265,000 bbl. daily, with a possible maximum yield of 515,000 bbl. daily. However, present pipe-line facilities are not adequate to transport the larger amount.

The commission also heard a recommendation that the Yates field be given a water-oil ratio of 10 bbl. of water to 1 bbl. of oil. This recommendation came from Peter Gregory, engineer representing the Yates Pool Advisory Committee, who told the commission that with such a ratio he believed the pool could produce 40,-000 to 50,000 bbl. daily with greater efficiency than it is now producing 22,000 bbl.

Meanwhile, the commission extended the principle of closing in oil wells producing an excessive amount of water to the Talco field in Franklin and Titus counties.

Government Seeking Data For Synthetic-Oil Plant

WASHINGTON, D. C. — Construction by the Government of commercial-scale pilot plants for experiments in the production of liquid fuels and lubricants from coal, shale, and natural gas is contemplated by a bill (S. 1243) on which the Senate committee on public lands opened hearings this week.

The bill is sponsored and strongly endorsed by Secretary of the Interior Harold L. Ickes and officials of the Bureau of Mines. The bureau has been conducting laboratory-scale experiments on synthetic liquid fuels for many years. The bill would authorize an appropriation of an unspecified sum for the bureau to acquire and construct facilities, processes and patents for large-scale research.

Secretary Ickes was the first witness before the committee, speaking also as petroleum administrator for war and as administrator of solid fuels for war. He has long advocated long-range planning for substitutes for petroleum in case oil reserves should fail.

The committee is scheduled to hold further hearings in Pittsburgh, Pa., August 6; Salt Lake City, Utah, August 9, and Sheridan, Wyo., August 11.

A long list of witnesses has been invited to appear at the hearings, including federal and state government officials and representatives of oil and coal companies that have conducted research on methods for producing liquid fuels from coal or natural gas.

A subcommittee of the Senate committee on public lands and surveys, of which Sen. Joseph C. O'Mahoney, of Wyoming, is chairman, will conduct the hearings. Senator O'Mahoney also is the author of the bill, S. 1243.

In addition to Chairman O'Mahoney, other members of the subcommittee who will attend the hearings are Senators Abe Murdock, of Utah, and Chan Gurney, of South Dakota. Rep. Jennings Randolph, of West Virginia, chairman of a subcommittee of the House committee on mines and mining, and members of his committee also will participate at the invitation of the Senate subcommittee.

For several years the Bureau of Mines has operated the laboratory-size plant at Pittsburgh and has proved that most of the coals from the nation's immense reserves of bituminous coals and lignites can be liquefied to produce gasoline, fuel oil, diesel oil and other oil products. The bureau also has produced oil from domestic oil shales in experiments conducted in the Rocky Mountain area.

"The United States is losing ground as the outstanding producer of petroleum," Secretary Ickes advised Senator O'Mahoney. "Since 1938, the consumption of petroleum in the United States has exceeded the discovery of new reserves. I believe the time is at hand for more intensive research in the production of synthetic fuels, especially with regard to larger-scale demonstration plants, both for possible war use and in the postwar era."

In 1935, Congress granted funds to the Bureau of Mines to begin research in the production of liquid fuels from coal by hydrogenation and since then the bureau has continued its work in the small-scale unit at the experiment station at Pittsburgh. In processes employed by the bureau in its small plant, about 30 gal. of gasoline are produced from a ton of lignite and about 60 gal. from a ton of high-volatile bituminous coal.

From 1926 to 1929, the Bureau of Mines studied the extraction of oil from domestic oil shales but had to discontinue the project due to a shortage of funds. During this research, conducted near Rulison, Colo., the bureau mined and retorted approximately 6,000 tons of oil shale and produced 3,600 bbl. of shale oil.

According to Bureau of Mines officials, the United States has about 3.5 trillion tons of coal reserves—enough to supply the nation with solid fuel and gasoline for at least 1,000 years. Reserves of oil shales are sufficient to produce about 92 billion barrels of oil. Natural-gas reserves, the bureau reports, are capable of supplying "substantial quantities" of liquid fuels.

Wide interest has been manifested in the series of hearings starting this week on various aspects of the nation's synthetic-petroleum supply. Lag of natural-reservoir discoveries in recent years intensifies interest in shale-oil reserves and oil obtainable from coal.

In Germany, gasoline first was produced from coal on a laboratory scale in 1914, but the process was not perfected for commercial operation until 1926, or 12 years later. This method, one of two employed by the Nazis to produce synthetic fuel, turns out about 32,000,000 gal. of gasoline a year. Experts estimate that approximately one-half the gasoline used by the German war machine is obtained from coal.

"The lesson learned from Germany is that commercial-scale production of synthetic liquid fuels cannot be developed overnight," Secretary Ickes said. "Adoption by American industry on a large scale can follow only if there is preliminary research on a scale large enough to show that the processes are commercially economic and feasible."

Rationing-Equalization Plan May Be Disclosed In Detail This Week

WASHINGTON, D. C.—Announcement is expected momentarily on the administration's plans to revise the gasoline rationing program in all states east of the Rocky Mountains, concerning which there have been countless rumors ever since the Petroleum Administration for War announced its intention to "equalize" supplies in Districts 1, 2, and 3.

The announcement may be made shortly by James F. Byrnes, director of War Mobilization, who has been preparing a report on the gasoline supply situation, or by Petroleum Administrator Harold L. Ickes, who informed an unofficial committee of Midwest congressmen that he was ready to discuss the subject with them in Chicago this week.

The only thing that appeared certain was that when any announcement is made it will be official and will represent the views of all government agencies concerned.

Officials have refused comment on any of the various reports of alleged inside information regarding lifting the ban on pleasure driving in the East, increasing coupon values and allowances for public transportation, and reducing civilian consumption in the Middle West and Southwest.

The only authoritative statement was that by Mr. Ickes the middle of last week in announcing tank-car shipments, when he said, "I think that it can be said positively that we shall soon arrive at the point where we can make available a somewhat larger supply of gasoline for civilian use in the East."

Bayou Pipe Line's Contribution to War Transportation Celebrated

by Paul Reed

THREE dinners were given by Shell Pipe Line Corp. for employes of Bayou Pipe Line Co. and members of its own staff in recognition of the completion of Bayou line and the attainment of operating capacity which has exceeded expectations. Working under unusual difficulties with used equipment, this line pumped, via the Plantation connections, the first refined products to travel all the way from Texas to the East Coast by pipe line.

All of the 140 employes of the Bayou Pipe Line Co. with the exception of only 13 who had to remain on duty were able to attend the dinners together with Shell office employes. The dinners were given as follows: July 22, Majestic Hotel, Lake Charles, La.; July 23, James Hotel, Opelousas, La.; July 26, Rice Hotel, Houston, Tex. The meetings were addressed by executives of Shell directing affairs of Bayou Pipe Line Co.

H. H. Anderson, vice president, welcomed the employes and expressed the gratitude of the Shell corporation and other companies participating in the project. T. E. Swigart, president, discussed what had been achieved in the undertaking. D. H. Lewis, chief engineer, reviewed the operation of the line from the start and presented data on the results obtained.

More than 60,000 bbl. daily has been moved for considerable periods through the 10-in. section of the line between Neches, Tex., and Baton Rouge, La., and 40,000 bbl. daily between Baytown and Neches, Tex. These throughputs are regarded as high for lines of these diameters. In moving 350,000,000 gal. of gasoline there was a loss of only 0.0035 per cent, including the loss attributed to tanks at the delivering and receiving ends. This was only half of what was reasonable to anticipate.

The significance of what the Bayou Pipe Line organization has done is reflected in the following excerpts from telegrams:

"Congratulations on the speed with which the pipe-line gangs completed the Bayou system and the efficiency with which the operating employes brought it so quickly to its full capacity, working under the extreme difficulties which you encountered and particularly because of the continual headaches and heartaches which we know you suffered because of the second-hand material you had to gather and use. You have earned the deepest thanks of the boys in Africa and Sicily who are using the oil from the line to blast the Nazi rats, the appreciation of the people on the eastern seaboard who will be a little warmer this winter (we hope) because of your work, and the admiration of everyone in the oil industry who knows the kind of job you did." Signed, W. R. Boyd, Jr., chairman, PIWC.

"This contribution to the war effort is another fine example of the teamwork of the workers and management in the oil industry in furnishing the necessary supplies of petroleum to our fighting forces and essential requirements on the eastern seaboard." Signed, Ralph K. Davies, deputy petroleum administrator for war.

"This is an example of what can be done even with second-hand material and under adverse conditions when free Americans set their minds to it." Signed, R. V. Hanrahan, vice president, Humble Pipe Line Co.

"The fine and patriotic job done by the construction employes and the operating employes of the Shell Pipe Line has the hearty approval and acclaim of the Railroad Commission of Texas as well as of all Americans who are devoting their efforts to make the home front productive of all that it takes to win this war." Signed, Beauford H. Jester, chairman, Railroad Commission.

"The fact that you completed this line at all in the face of the handicaps of war entitles you the highest praise, moving through it daily 2,500,000 gal. of gasoline from six different Texas points is another outstanding result." Signed, Coke Stevenson, governor of Texas.

Attrition Blows Aimed at Axis Oil Supply

(Continued from Page 14)

ceiving approximately 73,000 bbl. of oil daily. Rumanian oil moving to Germany is handled partly by railroad facilities. Substantial movement also is reported through a new pipe line running to the Danube on the western border of Rumania and thence by barges and the river route to south German plants for further processing and compounding.

Determination to bomb out of existence the most important petroleum installations without which Germany's air power would be even less effective is indicated as part of the Allied high strategy. Hamburg, one of the most bombed cities in Germany and reported to be practically destroyed by repeated attacks during the past 2 weeks, is one of the important refining centers.

Several of the refineries in the Ploesti area, as indicated by the accompanying table of crude and cracking capacities, are modern manufacturing installations. None of the Rumanian plants were qualified to manufacture 100-octane gasoline up to the time American and British officials of operating companies were placed under technical arrest and expelled from the country just before the German occupation. No details of improvements or new installations made since the occupation forces took over the refineries have been received in this country.

The inherent short position of Germany in petroleum supplies for its military operations long has been considered one of the weakest points in ability of the Axis to conduct a protracted war. Germany accumulated vast stocks of petroleum in the 5 years immediately preceding outbreak of the war. For example, German imports of Rumanian oil in 1935 totaled about 800,000 tons, or 5,600,000 bbl., compared to an average of 175,000 to 200,000 tons for the previous 8 years. Another substantial increase to more than 1,200,000 tons, or roughly 8,500,000 bbl., in Rumanian shipments to Germany occurred in 1936.

One of the weakest links in German industrial and military operations has been the lack of an adequate supply of lubricating oils and greases. Necessarily sketchy reports reaching Allied channels of information stress the failure of mechanized military equipment on the Russian front and in the German internal transportation system because of improper lubrication. Consequently Rumanian petroleum, the only substantial and proven natural supply available to the Axis, takes on added significance. Likewise, the Allied attacks on the key centers of German petroleum operations appear to be of particular importance, possibly based on information that any further contraction of supplies will be more damaging at this stage of the war than in previous months when storage provided the latitude necessary to minimize destruction of any one or even several manufacturing plants.

FOUNDED IN 1910

BY PATRICK C. BOYLE

the OIL AND GAS JOURNAL

A Matter of Enforcement

THE Washington agencies in their plan to make more gasoline available to civilians in District 1 by taking it away from Districts 2 and 3 are dodging the real issue in this matter of supply and distribution. The solution to this problem lies in the adoption of an equitable rationing program and then enforcing it.

The deficiencies in the present gasoline rationing procedure have been apparent from the time it started on a sectional basis over a year ago. What it has meant since national rationing became effective is revealed in the latest consumption figures.

For one month gasoline consumption compared to the same period of the previous year ranged from a decline of 39 per cent in one state to an increase of more than 50 per cent in another.

Large military demands and the relatively longer distances which civilians travel were factors in the demands of some of the states showing increases or small decreases. But after making full allowance for these special conditions, it is apparent that there has been little uniformity in the enforcement of gasoline rationing.

The information on supply shows that if rationing is equitably enforced there is sufficient gasoline for every class of user without undue hardships on anyone. A few figures on current operations will substantiate that contention.

Crude runs to stills at domestic refineries this month will average close to 4 million barrels daily, the largest operation of any full month since the war began and only slightly under the 1941 peak.

This points to a total output of refinery gasoline and natural gasoline of 53 million barrels. The Bureau of Mines estimates that motor fuel demands from all sources in this country will aggregate 55½ million barrels to be partially supplied with seasonal withdrawals from storage.

To supply 27 million family cars with the base A ration of 4 gallons weekly during August will require 11½ million barrels of gasoline. This is only 20 per cent of the total supply that will be available.

When the present rationing plan was inaugurated it was realized that many could not do their part in the war program with the minimum gasoline allowance. It was expected that a few extra gallons monthly would take care of a majority of these cases with a small percentage, including owners of commercial vehicles, requiring prewar quantities.

There has been little uniformity in the granting of extra gallonage. Black markets exist. Laxity in enforcement on the part of local rationing boards is supported in some areas by state officials who have opposed the rationing plan from the start.

Obviously reducing coupon values is no remedy for a condition like this. It will force more A card holders to request extra gallonage while B, C and T operators will seek more coupons. In the end A card owners who presumably represent more than 50 per cent of the total will have all their gasoline taken away from them.

The great majority of car owners want to do their full part in carrying out whatever curtailment in gasoline consumption by civilians is necessary. But they will not support a procedure that is weak in plan and enforcement and which is rapidly becoming a complete farce.

The petroleum industry and its war administration will provide a workable remedy if given the opportunity.

Another Rise Anticipated In Domestic Crude Demand

WASHINGTON, D. C. — Another rise in the demand for domestic crude oil is forecast for August by the Bureau of Mines. Domestic crude oil required to meet the market demand this month is estimated at 4,151,600 bbl. daily, 227,300 bbl., or 6 per cent, higher than the actual for August 1942.

The bureau forecast prepared under the supervision of A. G. White, chief, Petroleum Economics Division, Economics and Statistics Service, speculates this month on effects of an increase in the number of available tankers.

"Larger shipments of refined products from the Gulf ports to the East Coast, or to meet requirements abroad, would involve an increase in domestic crude production and in Gulf Coast refinery operations," the report states. "Whereas," Mr. White continues, "if more crude was shipped from the Gulf it would step up refinery operations in the East Coast. An increase in the movement of products, particularly fuel oils, from Caribbean refineries to the East Coast, or to meet war requirements abroad, would reduce further gains in domestic crude production and runs, whereas larger crude imports would increase operations in coastal refineries without having to draw on domestic crude."

The crude-oil demand forecast is based on motor-fuel requirements of 55,500,000 bbl. in August, an increase of 8 per cent over the actual for the same month last year, when sales were abnormally low following the inauguration of coupon rationing in the eastern states.

Demand for motor fuel during the second quarter was within 1 per cent of the requirements for the same period last year. This fact disclosed by the Bureau of Mines report last week is pertinent in view of the current program for equalizing rationing.

A reduction of only about 1 per cent in the motor-fuel demand during the second quarter of this year, compared with 1942, was pointed out by the bureau report. First quarter motor-fuel demand was off 18 per cent.

Gasoline Production Lags

"Gasoline production," the bureau observed, "has not kept pace with the unexpectedly large demand and heavy withdrawals from gasoline stocks have been necessary."

The bureau estimates a decrease of 2,700,000 bbl. in finished stocks of motor fuel during August, compared with a liquidation of 254,000 bbl. in the same month last year.

Commenting on the current and general situation, the bureau said:

Current.—"Daily average crude-oil production and total runs to stills during the 4 weeks June 5 to July 3 were 3,979,000 and 3,906,000 bbl., respectively. During this period stocks of domestic crude oil declined 138,000 bbl. daily, indicating a demand for domestic crude of 4,117,000 bbl. daily.

General.—"The daily average demand for domestic crude petroleum was 3,775,000 bbl., in the first quarter of 1943, rose sharply to 3,965,000 bbl. in April, showed a small decline to 3,962,000 bbl. in May, rose to approximately 4,100,000 bbl., according to current figures available for June and may exceed 4,150,000 bbl. daily in July. The recent sharp rise in refinery operations reflects the recovery of pipe-line movements from the effects of flood damage in May, the anticipation of larger overland oil movements due to the completion of the new pipe line to the East Coast, a continued heavy liquidation of crude stocks, and an upward trend in crude production. Further increases in crude demand will depend primarily upon the extent to which crude production can be expanded and on a substantial gain in boat movements of either crude or products."

The bureau estimates the refinery yield of gasoline at 37.7 per cent on crude charged to stills this month compared to an actual figure of 39.06 per cent a year ago.

Natural gasoline to be blended at refineries is estimated at 5,170,000 bbl., compared to a forecast of 4,990,000 bbl. in July and an actual figure of 4,909,000 bbl. in August 1942.

SUMMARY OF FORECASTS FOR AUGUST 1943 (Barrels)

	Forecast Aug. 1943	Forecast July 1943	Actual Aug. 1942
Demand for motor fuel:*			
Domestic demand and supply	55,500,000	54,300,000	51,542,000
Supply of motor fuel:			
Straightrun and cracked	46,030,000	45,110,000	44,579,000
Natural gasoline used at refineries	5,170,000	4,990,000	4,909,000
Total refinery production	51,200,000	50,100,000	49,488,000
Other natural gasoline and imports	1,600,000	1,700,000	1,800,000
Decrease in finished stocks	2,700,000	2,500,000	254,000
Available supply	55,500,000	54,300,000	51,542,000
Crude-oil requirements:			
Per cent yield of gasoline from crude	37.70	38.00	39.06
Refinery crude required	122,100,000	118,700,000	114,135,000
Daily average	3,938,700	3,829,000	3,681,800
Domestic crude runs	121,700,000	118,400,000	113,923,000
Exports, fuel and losses	7,000,000	6,800,000	7,731,000
Total demand for domestic crude	128,700,000	125,200,000	121,654,000
Daily average	4,151,600	4,038,700	3,924,300
Decrease in domestic stocks	.....	.....	1,225,000
Actual production	.....	.....	120,429,000
Daily average	.....	.....	3,884,800

*The term "motor fuel" as used in this report includes gasoline and naphtha used for all purposes, but does not include heavier distillates used in the operation of tractors or burned in diesel engines.

Drake Well Board Elects Officers and Outlines Development Program

TITUSVILLE, Pa. — Erection of an exact replica of the Drake well was among the projects receiving favorable consideration here last week at an organization meeting of the Drake Well Memorial Advisory Board.

Charles B. Stegner, president of the Crawford County Bar Association, was elected chairman of the board; J. M. Bloss, president of the Second National Bank, was elected vice chairman and William H. Scheide was named secretary and treasurer. All three men are from Titusville.

The board, in addition to the officers, is composed of Dr. Park A.

Dickey, geologist for the Forest Oil Co., Bradford, Pa.; Dr. Paul H. Giddens, professor of history, Allegheny College, Meadville; Edgar T. Stevenson, editor of Titusville Herald, and Edward P. Boyle, president of the Derrick Publishing Co., Oil City, Pa.

The advisory board has the duty of developing a program both for immediate action and future consideration. The board will meet the last Friday of each month.

Dr. Donald A. Cadzow of Harrisburg, Pa., executive secretary of the Pennsylvania Historical Commission, attended the board meeting last week and submitted a tentative budget covering the $25,000 appropriation for a 2-year period.

Dr. Giddens indicated his acceptance of appointment on a part-time basis as curator of the memorial. Details will be worked out with Dr. Giddens and the historical commission.

Creole and Lago Consider Revised Merger Proposal

NEW YORK.—Special meetings of Creole Petroleum Corp. and Lago Petroleum Corp. have been called for August 17 and 18, respectively, to consider a revised plan for consolidation of properties in Venezuela.

A joint announcement said the properties of Lago involved had a value equivalent to 2.8 times the worth of Creole. It was suggested that 19,632,254 shares of Creole be issued to Lago in payment. In order to do this, Creole under terms of the proposal would increase its authorized stock to 27,000,000 shares of $5 par. It now has outstanding 6,974,356 shares.

It also is proposed that the Standard Oil Co. of Venezuela, a Creole subsidiary, be liquidated. Creole then would take over oil concessions formerly held by Standard of Venezula, Lago, Lagomar Oil Concessions, Inc., and Compania de Petroleo Lago, the latter two Lago subsidiaries.

As a part of the plan, Lago would transfer to Creole all Lago assets except $10,000,000 receivable from Jersey Standard and Lago investments in Lago Oil & Transport Co., Ltd.

Eastern Refiners Told to Run All Available Crude

WASHINGTON, D. C.—Eastern refiners were notified this week by the Refining Division of the Petroleum Administration for War that August crude quotas are limited only by the capacity of facilities and the available supply.

All District 1 refiners were urged to increase production of home-heating oils and to manufacture the maximum volume of 80-octane all-purpose gasoline.

Federal Order Digest

PAW Regulations

Well Spacing—District 2, Administrative Letter 7: Gives specific borders of Keensburg Consolidated field, Wabash County, Illinois; divides area into Keensburg-North and Keensburg-South; establishes uniform and positive spacing pattern, effective July 31.

Well Spacing—District 2, Administrative Letter 8: Defines Griffin field in Posey and Gibson counties, Indiana, and sets uniform spacing pattern, effective July 31.

Well Spacing—District 2, Administrative Letter 9: Defines New Harmony Consolidated field in White County, Illinois, and Posey County, Indiana, and fixes uniform spacing rules, effective July 31.

Price Rulings

Gasoline—RPS 88, Amendment 119: Rescinds temporarily previous OPA ruling calling for specific discounts on tank-wagon deliveries ranging from 10,000 to 60,000 gal., effective July 30.

Butyl Alcohol—MPR 37, Amendment 7: Sets sliding scale of maximum prices, based on each producer's average monthly costs for dibutyl phthalate, resulting in maximum prices ranging from 21 to 26 cents a pound, effective July 29.

Synthetic Tires and Tubes—MPR 415, Amendment 2 and MPR 119, Amendment 5: Defers specific ceiling prices for tires and tubes made wholly or in part on GR-S (buna-S), until November 1, effective August 1.

Heating Oils—SSR 7, Amendment 1: Permits commission sellers in the 30 rationed states to charge an additional commission of 0.3 cent per gallon for oil sold between December 29, 1942, and February 24, 1943, effective August 4.

Trucks—MPR 136, Amendment 96: Places all new trucks, buses and commercial trailers authorized for limited production by WPB under strict price control, effective August 12.

Wire Cable—RPS 82, Amendment 4: Provides for the individual adjustment of ceiling prices for producers and sellers of wire cable qualifying under rigid tests of essentiality of the product, effective August 4.

WPB Control Rulings

Welding Rods—CMP 5, Direction 10: Assigns preference rating of AA-2 to repair shops for acquisition of welding rods, effective July 28.

Petroleum Solvents — AO M-150, amended: Places high-flash naphtha under allocation control, issued July 28.

Construction — Authorizes use of CMPR 5 procedures for acquiring materials and products up to $500 in cost in cases where specific WPB authorization to start construction under Order L-41 is not required, effective July 29.

Manpower Commission Bulletins

Carbon Black—Bulletin 17, amended: Deletes word "furnace" after the words "carbon black" in order to include all types of carbon-black manufacture in list of essential war industries, issued July 29.

Pipe Lines—Bulletin 26-6: Deletes limitation of "common carrier" from the essential activity classification "gasoline pipe-line operation," issued July 29.

Louisiana to Determine Maximum Efficient Yield

NEW ORLEANS, La.—The Louisiana Conservation Commission has launched a program for determining the maximum efficient rate of production by requesting producers to submit data on this factor at the statewide proration hearing here August 17.

Each producer was asked to report in triplicate the maximum amount of oil that he thinks his properties could yield during the next 2 months without physical waste.

Purchasers were instructed to file their September and October nominations in triplicate not later than August 15.

Current allowable in Louisiana is 358,867 bbl. daily compared to a PAW production quota of 356,300 bbl. per day.

New Mexico Will Not Exceed Maximum Efficient Rate

SANTA FE, N. M.—Gov. John J. Dempsey last week asserted that if the authorization of PAW to increase August runs of southwestern refineries meant the abandonment of restrictions in crude-oil production, New Mexico would participate only on the basis of a direct contribution to the war effort.

He further declared that in any case the state's production allowable would not be increased in excess of 120,000 bbl. daily, the maximum which can be produced without damaging reservoirs. August allowable for the state is 110,000 bbl. per day.

Specific Spacing Patterns Set for Three Indiana and Illinois Fields

CHICAGO.—Specific spacing patterns for three fields in Illinois and Indiana were established here last week in Administrative Letters 7, 8 and 9 issued over the signature of C. C. Brown, acting director of production for PAW District 2.

Fields to which the letters refer are Keensburg consolidated, including Keensburg-North and Keensburg-South areas, Wabash County, Illinois; the Griffin field in Gibson and Posey counties, Indiana, and the New Harmony field, White County, Illinois, and Posey County, Indiana.

Spacing patterns in all three fields were established pursuant to authorization of R. K. Davies, deputy petroleum administrator, delegating the authority and discretion to determine and specify the "uniform well-spacing pattern."

The approved pattern for the Keensburg-North area is the center of the southwest quarter of respective quarter-quarter sections. Approved locations for the Keensburg-South area is in the center of the northwest quarter of respective quarter-quarter sections.

The Griffin field pattern will be based on approved locations in the center of the northwest quarter of respective quarter-quarter sections. Approved pattern for the New Harmony Consolidated field is for locations in the center of respective quarter-quarter sections.

The administrative letters define boundaries of the fields and contain instructions for appealing, if the approved pattern results in exceptional and unreasonable hardship of any operator.

Government Using High Portion of Texas Gasoline

AUSTIN, Tex.—More than 45 per cent of current gasoline consumption in Texas is being used by federal agencies, it was disclosed this week in a report to the state comptroller's office. The report showed that gasoline taxes were paid on purchases totaling 119,626,772 gal. during June, plus 113,004,642 gal. which went to tax-free federal government consumers.

The exceptionally high proportion of military nontaxed gallonage to taxable gallonage in Texas long has attracted much attention in the trade.

This compares with 110,686,374 gal. of fuel upon which taxes were collected in May and 122,944,162 gal. bought for the Government. May was the first month in history in which tax-free government purchases exceeded the sales to all other users combined.

In June 1942 taxes were paid upon 123,557,808 gal. and the federal Government took 28,426,935 gal. In prewar years, the comptroller's office reported that tax-paid gasoline sales in June ordinarily totaled about 150,000,000 gal., which compared with about 3,000,000 acquired monthly by the Government in peace time.

Collection of the 4 cents per gallon state gasoline tax in the first 10 months of this fiscal year totaled about $42,000,000, or $7,888,506 less than the corresponding portion of the previous year. Refunds to nonhighway users are running higher than last year.

Shell Group Reports On N.E.I. Destruction

NEW YORK.—Many details on destruction of Royal Dutch-Shell properties in the Netherlands East Indies and other portions of the Far East currently under Japanese control were disclosed for the first time last week. Reports on disposition of N.E.I. properties were made by the management of the parent holding company, the Royal Dutch Co. for the Working of Petroleum Wells in the Netherlands Indies, at the annual meeting in Willemstad, Curacao.

Managing directors warned stockholders that "very considerable sums of money will be needed to reconstruct all that has been lost."

Specific losses were listed as follows:

Oil fields: "It is known that they were all completely wrecked; some 3,000 wells were wrecked or rendered useless to the enemy in some way or another. Drilling equipment and machinery in the fields were destroyed."

Refineries: "Three were completely destroyed. In the fourth (Pladjoe refinery) Japanese paratroops were dropped in the middle of the refinery center. As a result of this attack it was not possible to accomplish the destruction of the refinery as planned. It is known, however, that the central power plant, the furnaces of the cracking plant and the central boiler plant were rendered useless and that the jetties were partly destroyed. The installations were afterwards shelled with mortars, and finally bombed several times by Netherlands Indian bombers; it has been reported that among other parts of the installations the alkylation plant was destroyed by these attacks.

"The group's refinery in Sarawak was completely destroyed.

"Storage installations near Singapore were almost entirely destroyed. Destruction included stocks of oil, material stores, workshops, storehouses and all records, documents, etc."

The special reserve of the Royal Dutch-Shell group established against future contingencies was increased last year to 72,000,000 florins. (A Dutch florin is worth about 53 cents in United States currency.) All net income in 1942, amounting to 23,000,000 florins, was added to the special reserve account.

OPA Revokes Tank-Wagon Discount Pending Study

WASHINGTON, D. C.—Previous instructions from the Office of Price Administration to grant specific discounts for graduated volumes of gasoline delivered by tank wagon in five eastern states and the District of Columbia have been temporarily rescinded.

For the time being, no discount will be required on bulk lot sales of gasoline by tank-wagon sellers in New Jersey, Pennsylvania, Delaware, Maryland, Virginia and the District of Columbia on deliveries under 60,000 gal.

The requirement that the maximum price on bulk lot sales of gasoline by tank-wagon sellers in the District of Columbia and these five states on deliveries of 60,000 gal. and more shall be ¾ cent per gallon less than the reference seller's tank-wagon price is not changed, although this requirement will remain on a temporary basis for the time being.

Anxious to be fair to the suppliers, the OPA has decided to reexamine the customary price practices in this area. A final determination is expected by September 1, 1943.

N.P.A. Picks New York for Annual Meeting Next Month

NEW YORK.—The annual meeting of the National Petroleum Association will be held here September 21 and 22 at the Waldorf-Astoria Hotel, it was announced last week.

The annual banquet will be held Wednesday evening, September 22, in the Wedgwood Room. The program now being arranged will deal with the war and postwar period.

Oil men planning to attend were urged to make hotel reservations promptly.

Patriotic Idea Developed Into Vital Link In Allied Chain of Oil Supply

NEW YORK. — Development of an idea that was first conceived by one of the country's top pipe-line engineers has been of inestimable value in maintaining petroleum supplies to the Allied military forces in their successful invasion of Africa and Sicily. The idea was that of the portable pipe line which has been developed by oil company, Army and equipment engineers.

At least four portable pipe lines were in use in North Africa during the recent campaign. They varied in length from 75 to more than 300 miles and transported both gasoline and water in separate lines.

The rapid advance of the Allied forces in Sicily was possible only because petroleum products, through the use of portable pipe lines, were maintained abreast of military units.

The first practical application of the portable pipe-line idea was to have been for movement of petroleum products over the Burma Road. Before materials could be manufactured, assembled and delivered, the Burma Road had been cut and the need for rapid movement of petroleum products became even more acute in the North African theater of operations.

Automatic Controls Are Feature

Automatic controls are so arranged that all stations stop pumping in case of a break in the line. But engines continue running and start pumping again automatically when the break is repaired. This automatic arrangement is the outstanding engineering feature of the portable system. The portable pipe line, now standard Army equipment, will handle gasoline at temperatures ranging from 40° below zero to 130° above, making this transportation system suitable for operations either in Alaska or the tropics.

Following are some of the high points in the background of the portable pipe line and a summary of the statistics on a standard system as now used by the U. S. Army. These data were disclosed here last week by Alexander Fraser, president of Shell Oil Co., Inc.

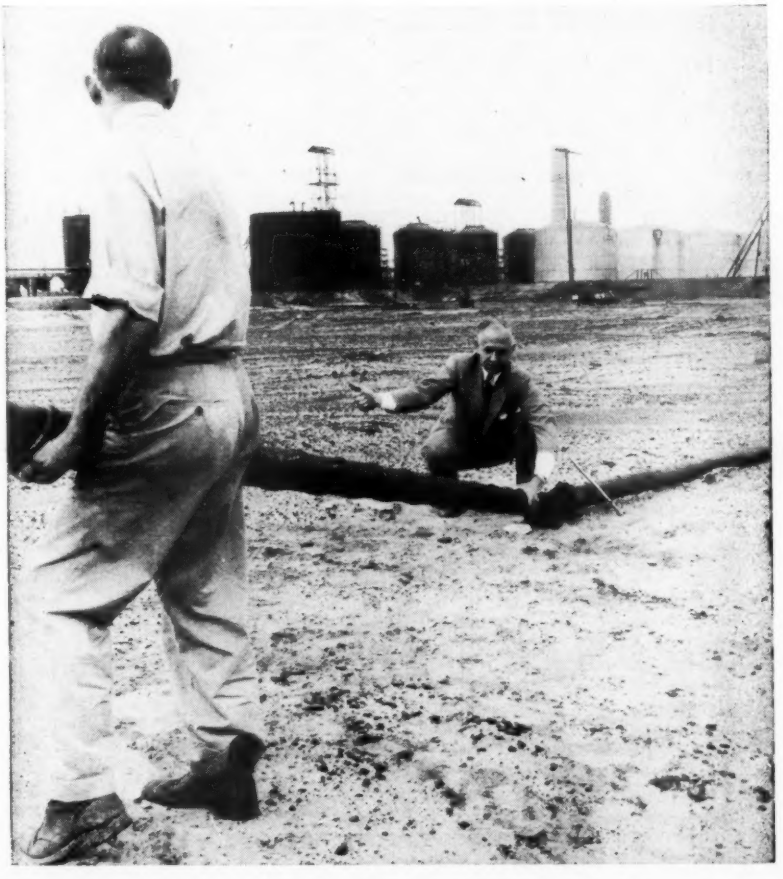
When World War II broke out in 1939, Sydney S. Smith, manager of the products pipe-line department for the Shell Oil Co., Inc., began thinking in terms of the petroleum-transportation difficulties which an army would face in conducting a "blitz" war. The sheer weight of petroleum products in bulk represented one appalling problem and the exposure of oil-carrying trucks to air attack was another.

Mr. Smith, like most Americans, expected that sooner or later the United States would be embroiled in the war. So in his spare moments, more as a patriotic contribution than anything else, he put on paper a design for a portable pipe line in the belief that it might some day be of use to the United States.

When the plan was completed, he showed it to Norman J. McGaw, vice president in charge of transportation and supplies for Shell, who authorized an appropriation of $10,000 for portable pipe-line experimentation in the Middle West.

The plan had been completed but no tests had been made when in 1941 Mr. McGaw was visited by a Mr. Bansfield, who made inquiries about the possibility of oil transportation over the Burma Road. He and Mr. McGaw discussed the hazards of bombing as well as poor surfacing, etc., which the Burma Road presented. Mr. McGaw said that a pipe line was the answer and called in Mr. Smith. The Smith plan was discussed in some detail and the matter was taken up with Mr. Fraser.

Mr. Fraser asked Mr. Smith for a complete report on the proposed portable pipe line. In 5 days a 33-page report, illustrated by 18 prints, was pre-



Sydney S. Smith, manager of Shell Oil Co., Inc.'s products pipe-line department, is ready to couple joints of portable pipe as a helper maneuvers it into position

pared and submitted to the Shell president.

Some of the features of the plan: Twenty-foot sections of flexible pipe were to be used; pumping stations could be located at 20-mile intervals; all of the equipment — pipes, couplings, etc., could be transported on truck, in trailers, or on mule back; no trenches needed to be dug since the flexible pipe could follow the contours of the countryside; the flow could be stopped automatically at any point along the line; automatic pressure controls prevented trouble in the case of a break.

The plan was accepted by the Chinese Defense Supplies Corp. interests, and application was made for the required steel under Lend-Lease. Much of the pipe had been accumulated for transportation when United States Army authorities, studying the plan, reached a quick decision that it could become an important cog in plans for United States operations abroad.

John H. Hall, superintendent of Shell's eastern line, under Mr. Smith, was loaned to the Chinese Government to survey the possibilities of installing a pipe line on the Burma Road. The 1,000 miles of pipe ordered for China were diverted to North Africa instead because in the meantime the Burma Road had been lost.

Tests were made by the Army in the Shenandoah Valley. During the tests a flood washed out a bridge over which a portable line had been slung. The strength of the pipe was indicated by the fact that the bridge remained suspended on the pipe line alone and the connection was not broken.

The only alteration in the original plant suggested by the Army was the reduction in size of the pumps to provide easier transportation. The result is that smaller pumps were located at 10 instead of 20-mile intervals.

Statistics on the Portable Line

Four-inch lines with capacity of 6,000 bbl. per day are used to move gasoline to combat areas. Six-inch lines, capable of moving upward of 10,000 bbl. daily, are used chiefly for transferring materials from ports to fuel depots from which 4-in. lines radiate to dispersal areas.

Pipe can be laid at the rate of 10 to 30 miles per day by unskilled or regular Army personnel. Eight to ten men can lay 2 miles of line per day.

It can be operated under the supervision of a few trained operators.

No communication system is necessary because of the automatic cutoff and because only one kind of product is shipped through each line; a separate line is laid for each type of product so as to avoid dispatching complications under battle-front conditions.

The light-weight flexible pipe is made in 20-ft. sections and each section, weighing only 90 lb., can be readily lifted and carried by one man. The pipe is 4 in. in diameter and spiral welded. The ends are grooved for Victaulic couplings.

The total weight per mile, including pumping stations, is approximately 13 tons. As the line is laid, gasoline can follow along immediately through the pipe. Maximum rate of filling is about 2.5 m.p.h.

The cost of the material (not including transportation or labor) is about $3,000 per mile.

Stations are powered with gasoline engines driving two-cylinder reciprocating pumps. One-third of all stations can be knocked out and two adjacent stations can be lost without reducing capacity of the line. Stations are well camouflaged but lines are not concealed because they take on color of the terrain and are not easily discernible from the air. Station exhausts are muffled and flame dampened.

Valves are inserted into the lines every half mile or so in order that sections may be cut out for repair, if necessary.

Engines and pumps were originally mounted on rubber-tired trailers for quick and easy movement, but in order to save gasoline and rubber the Army ruled that they were to be placed on skids instead.

Being flexible, the pipe line is not nearly so vulnerable to bombing as a rigid line. Also, damage caused by bombing, sabotage or other mishaps can be rectified quickly.

The German counterpart to the Army's portable pipe lines consists of 2½-in. pipe of low-pressure capacity suitable only for short hauls.

Expropriated Companies Lose Another Court Case

MEXICO CITY.—Foreign oil companies whose properties were expropriated by Mexico in 1938 lost another court decision here last week.

The Supreme Court held that the companies, upon being expropriated, had automatically lost their rights to fight Mexico's petroleum laws.

The companies suing, led by Huasteca Petroleum Co., subsidiary of Standard Oil Co. (New Jersey), had attacked the legality of laws giving the government subsoil title.

Texas Sets Next State-Wide Hearing on August 17

AUSTIN, Tex.—The state-wide proration hearing for the purpose of setting allowable production in September will be held here August 17, the Railroad Commission announced last week. Purchasers of crude oil and natural gas were asked to file their demand nominations prior to the meeting.

DEATHS

Sylvester Lonzo Cronin, formerly head of the land department of Pure Oil Co., and an employe of Pure for more than 35 years, died at the home of his son in El Dorado, Ark., July 28. Mr. Cronin was employed by Ohio Cities Gas Co. when it was merged with Pure. In 1929 he went to California as division manager. In 1936 he reached retirement age and went to Fort Worth to make his home, and later moved to El Dorado to make his home with his son.

R. E. Downing, 72, an independent oil operator in Tulsa for a quarter century, died July 29 at his home in Bixby, Okla., following a heart attack. He had been long associated with the Crosbie-Gillespie interests. In 1936 he moved to Bixby to be near some oil properties he had in that area.

C. G. Williams, 48, tool dresser for E. W. Delzer, drilling contractor of Buffalo, N. Y., died of a heart attack at Hamburg, N. Y., while en route to work.

Louis Samuel Panyity, 52, petroleum engineer and geologist of Bradford, Pa., died in a hospital in that city July 29. Death resulted from complications after a 3-year illness. A native of Hungary, he came to the United States as a boy. He was graduated from University of Pittsburgh, after which he joined Ohio Fuel & Supply Corp., becoming chief engineer. He went to Bradford 19 years ago as consulting engineer for the Sloan & Zook companies, and a year later opened his own office. Mr. Panyity was the author of several articles in The Oil and Gas Journal.

Adelbert Grant Liddle, 67, retired construction foreman of Stanolind Pipe Line Co., and a former resident of Tulsa, died at his home in Rogers, Ark., July 31. He had been with Stanolind for 40 years before he retired in 1937.

Frank F. Parker, 66, one-time employe of the Texas Railroad Commission, died at his home in San Angelo, Tex., last week, after an illness of several months.

Jesse Whisler, 42, employe of El Tejon Oil & Refinery Corp., Bakersfield, Calif., died July 29 as the result of burns received in a fire which destroyed the laboratory of the refinery.

William C. Russell, 69, oil and mining engineer, died at his home in Denver, Colo., on July 24. He pioneered the development of the Wilson Creek field, the largest oil field in Colorado.

Problems Involved in Conventional Refining of Sour Crudes

by R. B. Waite and R. H. Aitken*

DUE to the breadth of the subject, the discussion of problems attendant to refining of sour crudes has been confined largely to the experience of a certain refinery where such crudes have been processed for a number of years to the ultimate production of gasolines and fuel oil. A brief outline of conventional processing steps utilized at this refinery, together with representative tests on the crude, and raw and finished products, is presented. Problems involved in such refining practice are discussed under the general headings of safety hazards, corrosion problems, and treating problems. Remedial practices that have been found satisfactory are presented not as ultimate solutions but as suggestions which may aid in solving similar problems elsewhere. No attempt has been made to present a review of pertinent literature, nor to interpret principles underlying the many problems involved.

*Refining Dept., The Texas Co.

In view of the growing necessity of refining increased amounts of sour crudes and of the fact that some refineries are being forced to change from sweet to sour crude charge, this discussion of some of the problems peculiar to the refining of sour crudes is particularly timely.

For the purpose of this discussion, sour crudes are defined as those containing, or evolving upon processing, considerable quantities of hydrogen sulfide—H_2S. Crudes of a wide range of sulfur content may come under this classification.

Processing Methods Discussed

This refinery operates on a sour crude to ultimate yields of gasolines and fuel oil. Fig. 1 is a simplified schematic flow diagram illustrating the processing steps utilized.

Crude is charged to the crude distillation unit at which an overhead

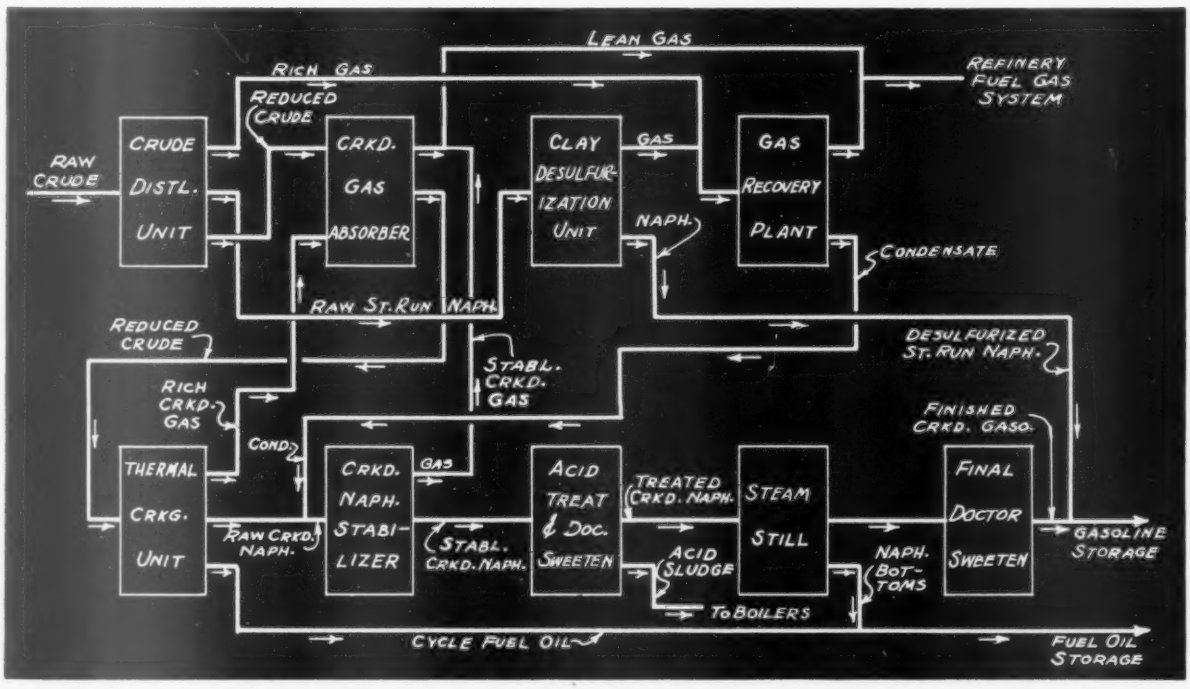


Fig. 1—Schematic flow diagram of plant processing steps

cut of straightrun naphtha, and a bottoms cut of reduced crude are produced. The raw straightrun a naphtha cut is processed by passage through a catalytic clay desulfurization unit which is, at this refinery, an integral part of the crude distillation unit, and the desulfurized straightrun naphtha after being caustic washed for hydrogen sulfide removal is run down to tankage as a sweet low-sulfur product without further treatment.

Gas produced in depropanizing the straightrun naphtha at the crude still is delivered to a gas-recovery unit. Condensate produced there is routed to stabilization equipment where it is mixed with the cracked naphtha for stabilization and further treatment. The dry gas produced is utilized as refinery fuel.

The reduced crude from the crude still is run to intermediate tankage whence it is charged to an absorber tower where light gasoline fractions are absorbed from cracked gases. The enriched reduced crude is then charged to thermal cracking units, where cracked naphtha, gas, and cycle fuel oils are taken off. The cracked naphtha is stabilized by passage through conventional stabilizing equipment, and the gas from the stabilizer, together with dry gas from the previously mentioned absorber and gas-recovery equipment, is utilized as refinery fuel. Cycle fuel oil, after passage through a stripper, is run down to tankage without further processing.

The raw cracked naphtha, which incidentally is rendered substantially H_2S free by stabilization, is charged from intermediate tankage to the treating unit where it is treated with sulfuric acid for sulfur reduction, neutralized with caustic soda, sweetened and run down to tankage. The naphtha is then charged to steam-stilling equipment, where a steam-stilled naphtha cut and a bottoms cut are produced. The steam-stilled naphtha is then charged to sweetening equipment where it is doctor sweetened and delivered to finished tankage. The bottoms cut is blended with cycle fuel, and the sludge produced in acid treatment is burned under steam boilers.

Types of Quality of Products

Table 1 shows representative tests on the crude charge, on raw and finished straightrun and cracked naphthas, and on the cycle fuel oil.

Although only gasolines and fuel oils are produced at this refinery, there is no intent of implying that other products cannot be satisfactorily produced from sour crudes. Sour crudes in common with other types cannot be either recommended or condemned for such cuts as kerosene, diesel or tractor fuels, lubricating-oil base stocks, and asphalts without evaluation of the particular crude under consideration for the products desired.

Safety Hazards

Two safety hazards, which if not entirely peculiar to the refining of sour crudes are certainly more prevalent when handling such stocks, arise from the toxicity of H_2S and the danger of spontaneous combustion of iron sulfide—FeS.

TABLE 1

	Crude	Raw SR naphtha	Desulfurized SR gasoline	Raw cracked naphtha	Finished cracked gasoline	Fuel oil
Gravity, °A.P.I.	34.2	55.9	55.9	61.1	61.0	10.0
Color, Saybolt	....	....	+21	+16	+30	....
R.v.p., lb. per sq. in.	....	4.5	4.5	10.4	10.2	....
Sulphur, per cent	1.35	0.132	0.025	0.249	0.150	2.5
Viscosity, S.F. at 122° F.	....	....	....	....	....	30
Flash, °F.	....	....	....	....	....	190
Fire, °F.	....	....	....	....	....	235
Distillation, A.S.T.M.:						
I.B.P.	198	113	108	82	98	....
5 per cent	216	....	....	....	....	....
10	248	182	178	115	117	....
15	280	....	....	....	....	....
20	316	208	208	140	141	....
25	352	....	....	....	....	....
30	395	....	....	....	....	....
35	423	....	....	....	....	....
40	475	....	....	....	....	....
45	514	....	....	....	....	....
50	551	266	264	226	227	....
55	590	....	....	....	....	....
60	634	....	....	....	....	....
65	675	....	....	....	....	....
70	710	....	....	....	....	....
75	738	....	....	....	....	....
80	760	....	....	....	....	....
90	....	365	365	334	335	....
95	....	....	....	....	....	....
End point, per cent	....	400	402	371	372	....
Recovery, per cent	....	97.5	98.0	97.0	97.0	....
Residue, per cent	....	1.0	1.0	1.0	1.0	....
Loss, per cent	....	1.5	1.0	2.0	2.0	....
B.s. and w., per cent	0.1	....	....	....	....	....
Salt, lb. per 1,000 bbl.	30	....	....	....	....	....

Hydrogen-sulfide gas is colorless, heavier than air, forms an explosive mixture when mixed with about 6 parts of air, is soluble in both water and oil, and is extremely poisonous. The gas has a characteristic odor of rotten eggs, but the sense of smell cannot always be relied upon for detection due to the paralyzing effect on the olfactory nerves, particularly in the high concentrations. When inhaled, H_2S may cause unconsciousness and death without warning. The following tabulation, presented by the Bureau of Mines, on the effects of different concentrations is of interest:

	Per cent
Fatal in 30 minutes or less	0.06-0.10
Causes dangerous illness in ½ to 1 hr.	0.05-0.07
Can be borne without severe effects for ½ to 1 hr.	0.02-0.03
Maximum safe concentration for continued exposure	0.01-0.02

If the hazards of H_2S gas have not been previously encountered, an educational program is in order to acquaint the entire personnel with the hazards involved, as well as with protective measures to be observed. A survey should be made of all tankage in crude, gas oil, kerosene, raw naphtha and similar services where H_2S gas is to be anticipated, and if H_2S is found, protective regulations should be observed. Standard laboratory tests can be used for detection of H_2S, and adequate special gas testers for this service are also available. If several tanks are connected to a common gas-gathering system, the possibility of one tank causing contamination of others in the group should not be overlooked. Suggested regulations include placing of "poison gas" signs on all tanks containing H_2S, the mandatory use of proper canister-type gas masks when gaging or working in or adjacent to such tanks, and requirements for special permits particularly for maintenance or repair forces to work on such tanks. When working inside tanks or in other confined spaces where H_2S is present, hose masks equipped with outside blower should be used.

Iron sulfide, which is formed by the reaction between H_2S and iron, is so easily oxidized that when it is exposed to air in the dry state it will frequently ignite spontaneously. For this reason great care should be exercised in opening tanks and lines which have contained products carrying high concentrations of H_2S. Preventive measures include washing down the interior of tanks through lower manways before circulation of air through top openings is permitted, and frequent wetting-down operations while tanks are open. Scale removed from tankage should be kept wet until it can be disposed of, preferably by being buried in a location remote from operating areas and tank farms. Similar precautions should be observed when opening running

lines which may contain FeS. Such lines should preferably be flushed with water, and should be left full of water to the greatest extent possible. Pipe and fittings removed should be kept wet, and dismantled equipment which will not immediately be reinstalled should be removed from hazardous areas to safer locations.

Corrosion

General acceleration of corrosion rates in a wide range of refinery equipment is probably the most serious problem experienced when refining sour crudes with equipment not specifically protected for such service. Corrosion due to the activity of sulfur compounds at elevated temperatures, above 500° F., is generally combated by selection of resistant materials. Corrosion at lower temperatures, including corrosion due to solutions of acids and salts in water, as well as corrosion due to sulfur compounds, may also be combated by selection of resistant materials, but neutralizing agents such as anhydrous ammonia, caustic soda and soda ash may frequently be used to advantage.

There are few if any perfect solutions for corrosion problems, and frequently the specific areas most effected, as well as the degree of the corrosion experienced, change considerably with different crudes or different operating conditions. Generally at any specific refinery it is the practice to develop satisfactory protective measures, as an economic necessity, basis plant scale trials, analysis of test specimen results, and knowledge of experience of others.

It is the intent of this article to outline the materials and methods of combating corrosion that have been found to be satisfactory at this particular refinery where moderately corrosive sour crudes are processed. They are not offered as perfect solutions but with the thought that they may aid in developing protective measures at other plants. It should be understood that some sour crudes are more corrosive than the sour crudes handled here, and may require more drastic corrective measures. Practices found suitable are discussed under the headings of tankage, running lines, and specific operating units involved.

Corrosion of Tankage

The tabulation in Table 2 indicates the service life before initial failure for tankage in various services and the point of initial failure as experienced at this refinery.

It will be noted that corrosion of tankage has not been particularly serious. However, attention is called to the fact that other refineries operating on our crudes have experienced much more severe tankage corrosion, and cases are known where initial failure of distillate rundown tankage has occurred in as short a period as 18 months.

Extensive work has been carried out throughout the industry to develop satisfactory means of protecting tankage against inside corrosion. The use of galvanized iron and aluminum roofs has shown promise, but such materials are practically unobtainable at present. Certain coatings, including paints, synthetic resins, coal-tar mastics, metal foils, and others have been investigated, but in general such protective measures have not been developed to the point where they are recognized as being entirely suitable.

Although not utilized at this refinery, the practice of periodically flushing or spraying crude oil on the areas above the normal oil height in crude tankage is said to give satisfactory results.

At this refinery reinforced gunite has been used satisfactorily for the protection of tankage against corrosion when the economics of particular cases warranted. Some of this gunite has been in service for 6 to 7 years and no evidence of deterioration has been noted. In certain cases gunite is applied to the under side of roof and rafters, and is extended to cover that portion of the top shell ring which is above the normal filling height. Guniting of tank bottoms, with the protection extended to cover that portion of the bottom shell ring in contact with the water level, has also been practiced. Where general corrosion is experienced, the entire inside surface of tankage is protected with reinforced gunite. Frequently, pitting of tank bottoms is aggravated by the presence of scale falling from the under sides of tank roofs and the top shell ring, and it will be found that protecting the upper surfaces by guniting eliminates or retards corrosion of the bottom. In view of the minimum quantities of critical materials required in providing gunite protection, it appears that this method of protecting tankage against corrosion is the most practical for use under present emergency conditions. It may be of interest to mention in this connection that ordinary gunite is attacked by alkali, but gunite prepared with Lumnite cement has been found satisfactory in the presence of strong caustic.

TABLE 2

Service Life of Tankage Before Initial Failure

Service—	Years service before initial failure	Point of failure
Crude storage	5-7	Roof, top ring
Reduced crude (RD)*	6-8	Roof, top ring
Untreated SR naphtha (RD)	4-6	General
H_2S free desulfurized naphtha (RD)	Probably above 12	None evident
Untreated stab. cracked naphtha (RD)	5-7	Roof, top ring, bottom
Treated and sweetened cracked naphtha (RD)	9-11	General
Steam stilled naphtha (RD)	6-8	Roof, top ring, bottom
Finished naphtha (RD)	Above 12	
Finished gasolines (storage)	Above 12	
Fuel oil (RD)	10-12	Roof, top ring

*RD, run down.

Corrosion of Field Lines

Corrosion of carbon-steel field or running lines at this refinery has not been excessive. From the standpoint of inside corrosion, lines handling crude, reduced crude, and finished gasolines present no problem. Failure due to inside corrosion is experienced on lines handling untreated stabilized cracked naphthas in 8 to 10 years, for lines handling untreated straightrun naphtha in 4 to 5 years, and for lines in dry air free sour gas service in 8 to 10 years. Where moisture is present in sour gas, however, corrosion of carbon-steel lines is frequently quite rapid.

At this refinery special resistant materials have been little used for field lines. However, at other refineries handling sour crudes corrosion of certain field lines, particularly those handling raw distillates and gases, has been excessive, with failures having occurred in as little as 1½ years, and such materials as cement-lined pipe have been satisfactorily used.

Corrosion-Crude Distillation and Clay Desulfurization Unit

Fig. 2 shows the processing flow for the combination crude distillation and clay desulfurization unit.

Crude is charged through heat-exchange equipment to a flash tower where light ends, together with moisture present in the crude, are flashed off. This flash is made under controlled pressure to prevent vaporization of water in exchanger tubes since otherwise deposition of salt will occur in the tubes at the point of vaporization of water. The partially reduced crude is then heated at 600°-650° F. in a fired heater and is delivered to a fractionating tower. Straightrun naphtha vapor from the tower is condensed and cooled in heat-exchange equipment, and the resulting straightrun naphtha is depropanized by flashing light fractions from a naphtha accumulator drum. Gas is routed to the gas-recovery plant and the naphtha passes through cooling equipment to a surge tank. Reduced crude is withdrawn from

the base of the fractionating tower and is pumped through heat-exchange equipment to tankage.

The raw straightrun naphtha is charged from the previously mentioned surge tank in balance with production, through heat-exchange equipment, and through a second bank of tubes in the fired heater, to a tower filled with granular clay. The vaporized naphtha at a temperature of 700°-750° F. is desulfurized by passage downward through the clay tower, is then condensed and cooled by passage through heat-exchange equipment, and after being caustic washed for H_2S removal, the sweet desulfurized naphtha is run down to tankage as a finished product.

At this refinery, gas from the crude distillation and clay desulfurization units is routed to a gas-recovery plant where, after removal of condensate, the dry gas, containing considerable quantities of H_2S, is burned as refinery fuel. If such gas-recovery facilities are not available, the H_2S-laden gas can best be disposed of by burning it in fired heaters, utilizing low-pressure gas burners.

The use of a 4-6 per cent chromium steel transfer line between the crude heater outlet and the fractionating tower has been found necessary, but in general carbon-steel pipe gives satisfactory service at these units for handling crude, reduced crude, raw and desulfurized naphtha vapor, desulfurized naphtha, and gas. However, special precautions are required to prevent severe corrosion of carbon-steel lines in raw naphtha service after the point of initial condensation, due to aqueous solutions of hydrochloric acid, which is evolved through hydrolysis of salts present in the crude. Ammonia neutralization is used to prevent excessive corrosion of the raw-naphtha rundown system. Without such protection carbon-steel lines have failed after only 6 months' to 1 year's service.

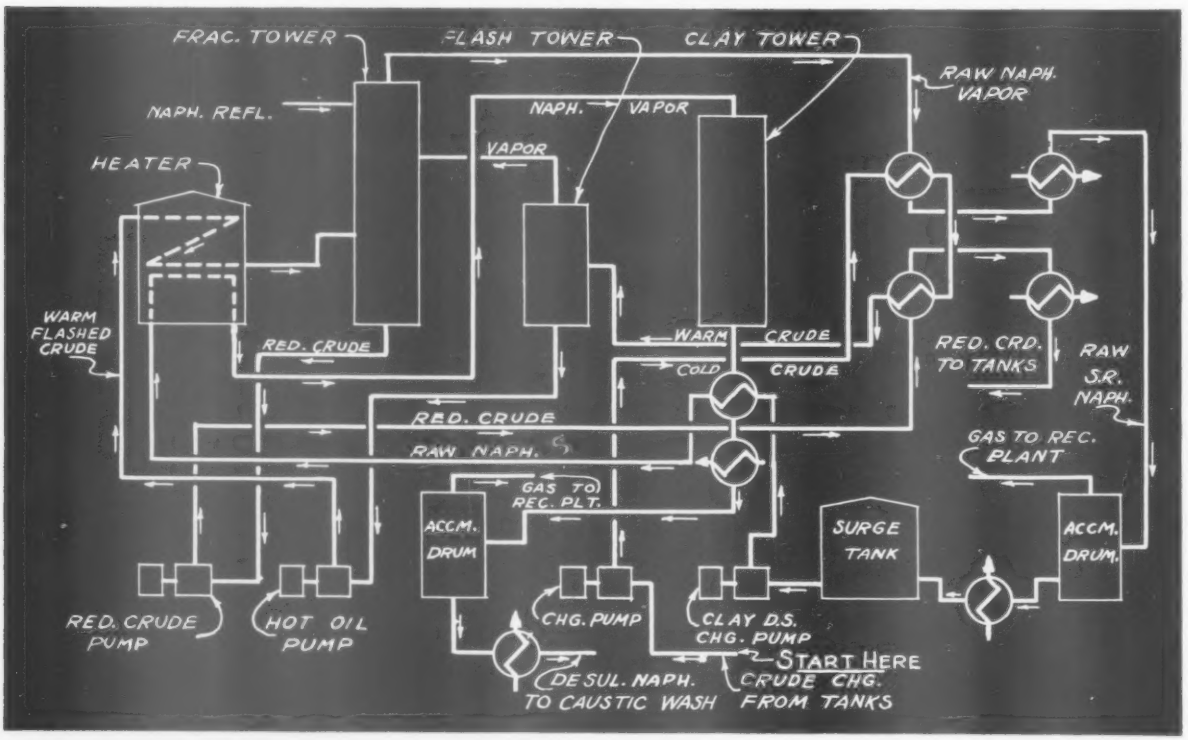
Control of Ammonia Injection

Anhydrous ammonia, averaging about 0.002 lb. per bbl. of crude charged, is injected continuously to the bottom of the fractionating tower, just above the liquid level. Ammonia injection is controlled to maintain a pH range of 6.8 to 7.2 in the water trapped from the raw-naphtha stream. Apparently the acid present in the naphtha is not fully neutralized in the presence of large quantities of H_2S unless the pH in the water is considerably higher than the range quoted. However, the use of excess ammonia will cause rapid failure of copper alloy tubes. The use of ammonia results in the deposition of ammonia salts in the heat-exchange equipment utilized to condense and cool the raw naphtha vapor. Since at this refinery condensation of the stripping steam used in the fractionating tower does not effectively dissolve these salts, approximately ¾ gal. of available steam condensate per barrel of crude charge is injected to the raw naphtha vapor line ahead of the first exchanger. This practice effectively prevents salt plugging, and is also thought to be beneficial in minimizing acid corrosion due to its diluting action.

The raw straightrun naphtha is caustic washed to remove H_2S and minute traces of HCl remaining after depropanization, in order to prevent corrosion of desulfurization unit equipment, particularly of carbon-steel tubes in a raw naphtha to desulfurized vapor exchanger. Caustic solution is maintained as a bottom layer in the raw naphtha surge tank, and is circulated to the raw naphtha rundown line ahead of an enclosed propeller type mechanical mixer installed in the line. This intimate mixing is required for effective neutralization, and approximately 0.17 lb. of caustic per barrel of naphtha treated is consumed. Other plants use soda ash instead of caustic treatment. It may be of interest that all traces of caustic and moisture are removed from the raw naphtha before it is charged to the desulfurization equipment by charging the naphtha upward through a vessel filled with rock salt. The caustic and moisture are withdrawn as brine from the bottom of the vessel.

Little corrosion is experienced here with 4-6 per cent chromium, half moly tubes, which have proved satisfactory in crude service up to heater outlet temperatures of 600°-650° F. Carbon-steel heater tubes have not

Fig. 2—Flow diagram of crude distillation and catalytic clay desulfurization unit



been used in this heater. No corrosion of 18-8 chromium - nickel - steel heater tubes in raw-naphtha service has been experienced, with heater-outlet temperatures of 700°-750° F. However, these tubes were selected for the service chiefly due to their being available as used material, and it may well be that other less costly materials would be satisfactory.

Admiralty-metal tubes are used in heat-exchange equipment for such services as condensing and cooling raw and desulfurized naphthas, crude to naphtha-vapor heat exchange, and reduced crude to crude heat exchange. Twelve to eighteen months' service is realized before failure occurs. Tubes 70-30 per cent copper nickel alloy have been used interchangeably with admiralty-metal tubes, and somewhat longer service is realized. Carbon-steel tubes are also satisfactory for crude to reduced crude heat exchange, giving about the same length of service as admiralty metal. Carbon-steel tubes are used for raw naphtha to desulfurized-naphtha-vapor heat exchange as the maximum temperature experienced is 700°-750° F., and if the raw naphtha is free of H_2S, HCl, and moisture it is thought that 18-24 months' service will be realized. Other refineries are using red-brass tubes in services where admiralty tubes are used at this refinery, and apparently the red brass is satisfactory. Cases are known where 18-8 chromium-nickel steel proved unsatisfactory in similar services due to fracture of the tubes.

Special corrosion resistant alloys are used to some extent in pumping equipment. Steam duplex pumps handling hot crude and reduced crude up to temperatures of about 600° are fitted with 11-13 per cent chromium steel liners, rods, valves, and valve seats, 4-6 per cent chromium steel pistons, and chromium nickel cast iron piston packing. For handling raw straightrun naphtha steam duplex pumps used are fitted with cast iron liners, K-monel rods hardened to about 285 Brinell, 18-8 chromium nickel steel valves, cast iron seats, cast iron pistons, and rock-hard quality hydraulic piston packing. A centrifugal pump fitted with chromium-nickel cast-iron case and impellers, nickel-cast-iron wear rings, and heat-treated steel shaft equipped with case-hardened sleeves is used, and this pump is spared by a standard cast-iron fitted steam duplex pump. Both pumps give satisfactory service.

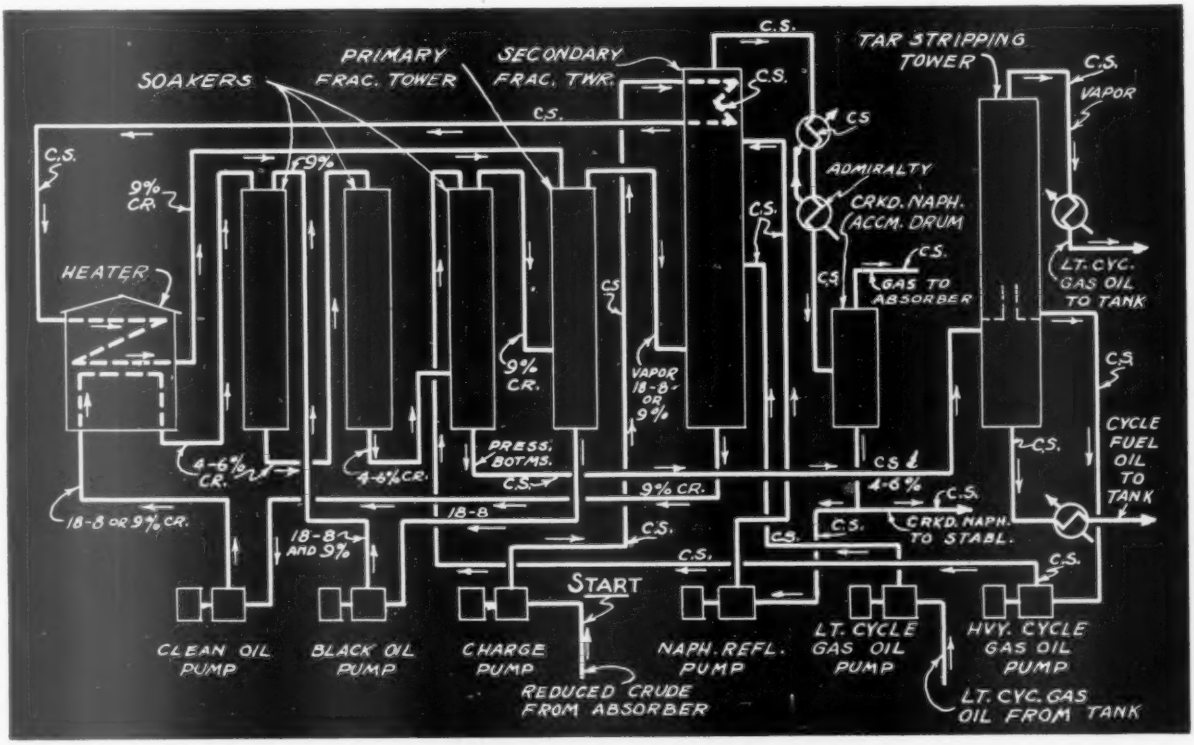
Corrosion of the crude fractionating tower, which is of conventional carbon-steel design, equipped with carbon-steel baffles, and cast-iron trays and bubble caps, has not been of sufficient magnitude at this refinery to warrant the use of chromium alloys for internal parts. At one time localized corrosion was experienced in the bottom of the tower and a hard shale-brick lining was satisfactorily used to protect the shell at this location. Such a lining is not used at present. Other vessels experience some general corrosion, but the problem is not sufficiently serious to require special protective measures. In the clay tower in naphtha-desulfurization service, a clay supporting screen fabricated of 18-8 chromium-nickel steel is used to guard against corrosion due to the presence of large quantities of H_2S at temperatures in the range of 700°-750° F. Other than in the cases mentioned, no special materials are required in towers and vessels utilized at the unit under discussion.

Corrosion—Thermal Cracking Equipment

Fig. 3 is a schematic flow diagram of the cracking unit. It is a conventional Holmes-Manley low-level clean-circulation unit consisting essentially of a gas-fired heater, three soaking stills and two fractionating towers.

Reduced crude, after passage through a cracked gas absorber not shown, is charged through heat exchange equipment and a section of the heater to the top of the primary fractionating tower. The charge is separated in the primary fractionating tower into a distillate and residuum. Heat is supplied from the vapors entering the fractionating tower from No. 3 soaker. The distillate passing overhead, along with the gasoline produced in the operation, are fractionated in a secondary fractionating tower, resulting in gasoline overhead and a clean gas oil as the bottoms from the fractionating tower.

Fig. 3—Flow diagram of thermal cracking unit



The overhead vapors from the secondary fractionating tower pass through exchangers, condensers and coolers to an accumulator drum where the gases are taken off, through the absorber system previously described, to fuel gas and the cracked naphtha goes to tankage. Naphtha reflux for the secondary fractionating tower is taken from a suction drum ahead of the cracked naphtha accumulator drum. Pressure bottoms are withdrawn from the bottoms of the soakers through a stripping unit to fuel oil tankage. Gas oils withdrawn from the stripper are recycled to the cracking zones.

Materials ranging from carbon steel to high-chromium-steel alloys are used for lines handling the various products at the cracking unit. The materials used for various lines, and which have been found satisfactory through experience over a period of several years, are shown on the flow diagram, Fig. 3.

For fired heater tubes in reduced crude service carbon steel is used up to oil temperatures of approximately 450° F., and 4-6 per cent chromium steel is used for oil temperatures up to 800° F. For tubes in clean cycle gas oil backtrap service 7 and 9 per cent chromium steel is used up to oil temperatures in the neighborhood of 950° F., and 4-6 per cent chromium steel is used above this temperature and up to 990° F. The higher chromium-content alloys would of course also be satisfactory for service up to the higher temperature.

Carbon-steel tubing is used for pipe-coil heat-exchange equipment, when heat is exchanged between naphtha vapor and reduced crude, naphtha vapor and water, and cycle fuel and water. Admiralty tubes are used in shell and tube aftercoolers, when heat is exchanged between naphtha and water.

The charge pumps handling cold reduced crude are not fitted with any special materials, and standard pumps suitable for the pressure are used. The hot-oil pump, handling clean recycle stock at temperatures ranging up to 765° F., is fitted with rods, liners, valves and seats of 11-13 per cent chromium steel, and pistons of 24-12 per cent chromium-nickel steel fitted with chromium-nickel-cast-iron piston packing are used. All parts of the pump exposed to the hot oil are lined with 11-13 per cent chromium steel. In handling black oil from the bottom of the primary fractionating tower a surge pump is used in which the hot oil does not pass through the pump block and the valves and valve manifold only are in contact with the hot oil. Valves and seats are 11-13 per cent chromium steel, the valve manifold is of 18-8 chromium-nickel steel, and the surge lines connecting the valve manifold with the pump block are made of 18-8 chromium-nickel steel, and 9 per cent chromium steel. The pump block is of forged steel fitted with 11-13 per cent chromium-steel cylinder liners and 4-6 per cent chromium-steel pistons fitted with chromium-nickel-cast-iron piston packing. Cracked-naphtha reflux pumps are fitted in the same way as are pumps used in straightrun naphtha service previously described under corrosion of the crude-distillation and clay-desulfurization unit. Standard pumps suitable for the pressure involved are used for handling heavy and light gas oils from the tar stripper, and no special alloys are used.

The soaking stills, primary fractionating tower, and secondary fractionating tower are completely lined with reinforced gunite, since otherwise severe corrosion is encountered. At other refineries 11-13 per cent chromium steel linings are used satisfactorily. Baffles of 4-6 per cent chromium steel are used in the primary fractionating tower and give 4 to 5 years' service, while carbon steel has failed in 6 months to 1 year. Bubble trays, and baffles made of 11-13 per cent chromium steel, are used in the secondary flash tower, and bubble caps of 11-13 per cent chromium steel or 18-8 chromium-nickel steel are used. No corrosion of these parts is experienced, whereas carbon steel parts have failed in 6 months to 1 year, and cast-iron trays and caps have failed in 2 to 3 years.

Little corrosion is experienced in the absorber tower, in which the reduced crude is contacted with cracked gases, and light gasoline fractions are absorbed from the gases. No special materials or protective measures for combating corrosion are used in this equipment. The tower is of standard carbon steel construction, and cast-iron bubble trays and cups are used.

Corrosion Stabilizer

In the stabilizing operation on cracked naphtha, the naphtha is charged through heat exchangers to a tower packed with cast-iron trays and caps. Extra heat is supplied by an outside steam-heated reboiler connected to the lower part of the tower, and reflux is provided by condensing and recirculating a portion of the overhead gases.

No special corrosion resistant materials are used in this unit except for admiralty tubes in the heat exchangers and no excessive amount of corrosion has been experienced.

The materials used in the pumps on this unit are the same as previously described for other naphtha pumps.

Corrosion-Gas Recovery Equipment

A gas-recovery system is in use, which takes gas from the crude stills only. The handling of gas from the cracking unit has been previously described and no gas is collected from tankage.

The system consists essentially of a water scrubber, a compressor, a cooler and a drip drum. In spite of a high concentration of H_2S in the gas and because no special corrosion-resistant materials are used, except for admiralty tubes in the cooler, no excessive corrosion has been experienced in this system.

Corrosion-Treating Plant Equipment

Corrosion of treating-plant equipment is not a function of sour crudes except in so far as high sulfur content necessitates the use of acid treatment.

Lines, valves and fittings in acid service are subject to more or less severe corrosion due to the absorption of moisture at points where slight leakage occurs, but no special corrosion-resistant materials are normally used.

Pumping equipment used for handling various naphtha streams, and chemicals such as caustic soda and doctor, are standard cast iron fitted with the exception that K-monel rods and 18-8 chromium-nickel-steel valves are used.

Corrosion-Steam Stills

As in the case of treating, corrosion in steam stilling equipment is not a function of sour crudes except in so far as high sulfur content necessitates the use of acid treatment. The acid-treated cracked naphtha is redistilled with steam for the removal of the heavy reaction products formed by the action of the acid. The naphtha is charged to the upper section of a tray packed tower and steam is introduced at the bottom. The overhead is run to tankage for subsequent resweetening and the bottoms are drawn to tankage.

The tower is of ordinary steel, the trays and caps are of cast iron and the exchanger tubes are admiralty metal. As an appreciable amount of acidity is developed during the distillation, caustic is injected into the tower just below the naphtha entry, and as an added protection the bottom of the tower is lined to about the level of the bottom tray with acid resistant gunite.

Treating

The amount of treating required on distillates from sour crudes will depend upon the amount of sulfur in the crude and its distribution, upon the products to be made, and upon the sulfur specification to be met. Since this refinery does not produce kerosene, tractor fuel, diesel fuel or furnace oil, the discussion of treating is confined to the handling of gasoline cuts.

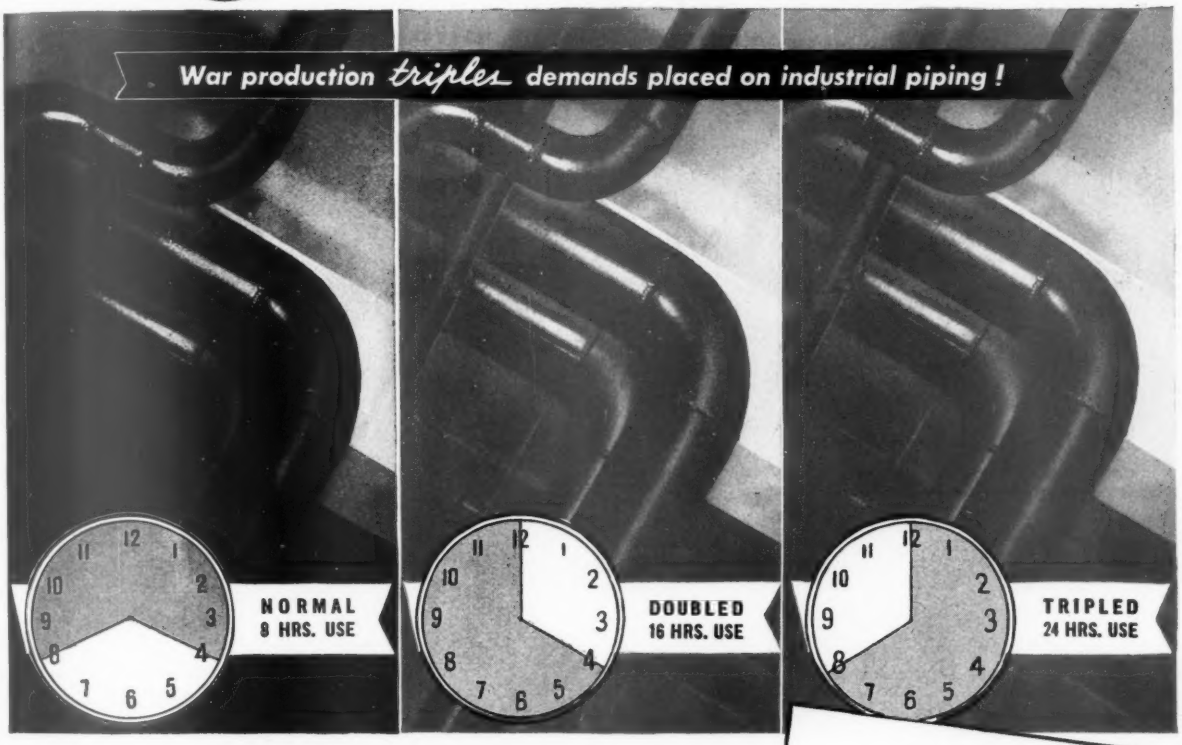
Gasoline from sour crudes in the lower ranges of sulfur content, or from those with low-sulfur content in the lighter fractions, may meet gen-

NO. 7 OF A SERIES

HOW TUBE-TURN WELDING FITTINGS BENEFIT WAR INDUSTRY

The FIRST WELDING FITTINGS 1ST AND STILL THE BEST

Welding with TUBE-TURN fittings gives extra strength and trouble-free performance needed today to insure uninterrupted piping service



'ROUND the clock, war-time operation for 24 hours a day instead of the normal 8 hours period *triples* the wear of oil, gas, power, chemical, heating, air, refrigeration and marine piping today.

Despite the extra strain that fittings naturally take, coupled with constant three-shift operation, Tube-Turn welding fittings are *practical insurance* against piping failures. Tube-Turn fittings are *stronger and safer* because of their exclusive construction advantages. They provide leakproof, trouble-free joints that last as long as the pipe itself. They can be installed faster and easier, can be quickly insulated, instantly eliminate maintenance worries, and provide streamlined, space-saving layouts.

Sizes, types and weights are available for every industrial requirement. *Write for catalog and data book No. 111.*

OTHER IMPORTANT WAR-TIME ADVANTAGES:

SPEED INSTALLATION: Less time needed for aligning, thanks to true circularity and uniform walls. Only simple butt welds required, easy even for novice welders. Whole sections can be preassembled on the ground.

SAVES CRITICAL MATERIAL: Absence of many flanges, bolts, nuts and heavy cast steel construction saves many tons of metal in a single piping system.

LAST LONGER: Smooth inner walls—with no ridges, waves or scale—means less corrosion and longer life.

LESS PRESSURE LOSS: Because of full effective radius and exact O.D. and I.D. alignment with the pipe, the flow is more efficient and pressure loss is less.

FEWER SUPPORTS NEEDED: Since welded piping weighs less and stands vibration better than flanged systems, few hangers or supports are required.

TUBE-TURN

TRADE MARK

Welding Fittings and Flanges

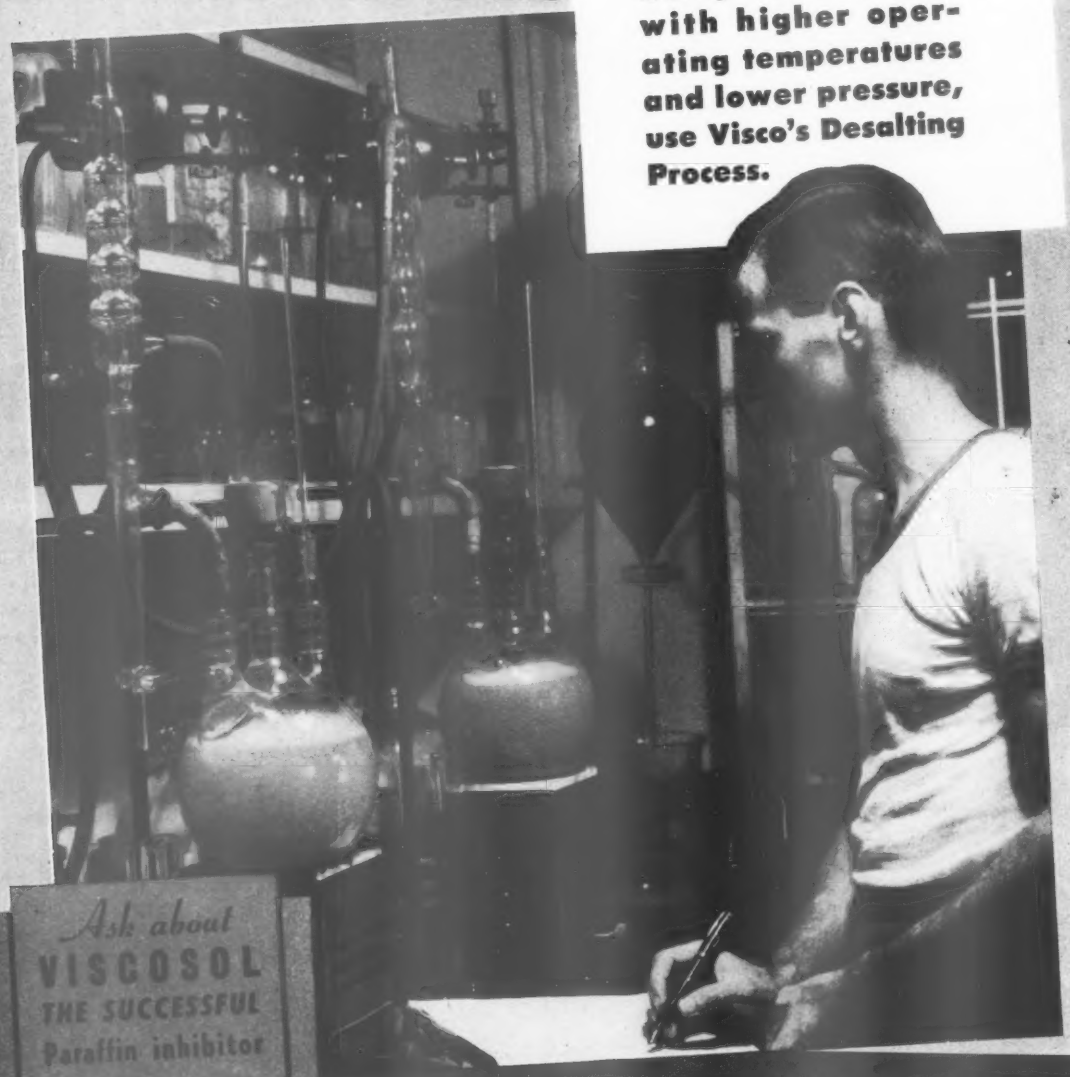
TUBE TURNS (Inc.), Louisville, Ky. *Branch offices*: New York Chicago, Philadelphia, Pittsburgh, Cleveland, Dayton, Washington, D. C., Houston, Los Angeles. *Distributors in principal cities.*

Winner of Army-Navy, Maritime Commission, Victory Fleet and Treasury Dept. Awards.

BUY MORE BONDS!

VISCO Desalting Chemicals are SUCCESSFUL and PROFITABLE

. . . . to increase daily throughput with higher operating temperatures and lower pressure, use Visco's Desalting Process.



VISCO

The Modern Emulsion Breaker

VISCO PRODUCTS COMPANY, INC., Houston, Texas

TABLE 3

	(a) 98% acid on SR sludge on cracked	(b) 98% acid on SR 66° B. acid on cracked
Total lb. of acid used per bbl. of total gasoline	3.04	4.35
Acid solution loss, per cent of total gasoline	.73	1.10
Polymerization loss, per cent of total gasoline	.35	.47

TABLE 4

	60 per cent cracked—treated with 2 lb. 66° B. acid per bbl. of doctor sweetened and steam stilled. 40 per cent SR — treated with 8 lb. of 98 per cent acid per bbl. and doctor sweetened. Total acid per bbl. of blend, 4.4 lb.	60-40 blend of cracked and SR treated with 4 lb. of 66° B. acid per bbl., doctor sweetened and steam stilled
Per cent sulfur in finished blend	0.105	0.103
Treating loss, per cent:		
Acid solution loss	0.38	0.56
Polymerization loss	0.51	1.00
Total loss	0.89	1.56

erally accepted sulfur standards without resorting to treatment for sulfur reduction. A great many sour crudes, however, will yield normal gasoline cuts which are high in sulfur, and some treatment for sulfur reduction will be required.

Methods of Sulfur Removal

The gasoline treating problem at this plant has been greatly simplified by the introduction of catalytic clay desulfurization on the straightrun gasoline as previously described.

The catalytic action of the clay causes most of the sulfur compounds to be converted to hydrogen sulfide, part of which is removed as gas from the accumulator drum and the remainder neutralized with caustic soda. The sulfur content is lowered from about 0.13 per cent to about 0.025 per cent, the clear octane is raised about 1.5 points CFRM and the susceptibility to tetraethyl lead is materially increased. The clay-treated product, after a caustic wash, is sweet to the doctor test and is pumped directly to finished gasoline blending. Clay life has been in the range of 5,000 to 10,000 bbl. per ton and very little attention is required. It may also be of interest to note that this process offers considerable promise for the preparation of low-sulfur aviation-gasoline stocks.

Cracked naphtha, at present, is treated with spent alkylation acid, neutralized with caustic soda, sweetened with doctor solution and sulfur, steam stilled and resweetened if necessary. Only enough acid is used to meet sulfur specifications on blends with the desulfurized straightrun and, since the sulfur content of the latter is normally lower than the previous acid-treated straightrun, less acid is required on the cracked with a resultant decrease in polymerization and solution losses.

It will be noted that the procedure for treating the cracked naphtha includes doctor sweetening before steam stilling. This is done because it has been found that an appreciable amount of sulfur removal is effected due to the conversion of the heavier mercaptans to disulfides which boil above the gasoline range and are consequently left in the steam still bottoms. Some hydrolysis takes place in the steam stilling which requires a small amount of resweetening.

Previous to the use of clay desulfurization on the straightrun gasoline, it was necessary to acid treat both straightrun and cracked stocks. The procedure was to add the required amount of acid to the straightrun, mix, settle, draw off the sludge and apply it immediately to the cracked. Experimental work in both laboratory and plant has proved that this method is more economical than the use of fresh acid on each component because less total acid is required for a given over-all sulfur reduction, and while this sludge acid is effective in reducing the sulfur content of the cracked gasoline—after steam stilling—it does not cause as much loss through polymerization and solution. In Table 3 are shown data from plant operation comparing:

(a) Treating straightrun with 98 per cent acid and applying the sludge from this treat to the cracked naphtha.

(b) Treating the straightrun with 98 per cent acid and the cracked with 66° Be. acid using just enough acid to give the same final sulfur content of the blend as obtained in (a).

It has also been shown that, for the same reasons, if it is necessary to acid treat both cracked and straightrun gasolines for sulfur reduction it is more economical to apply the acid to the two separately rather than to-

(Continued on Page 53)

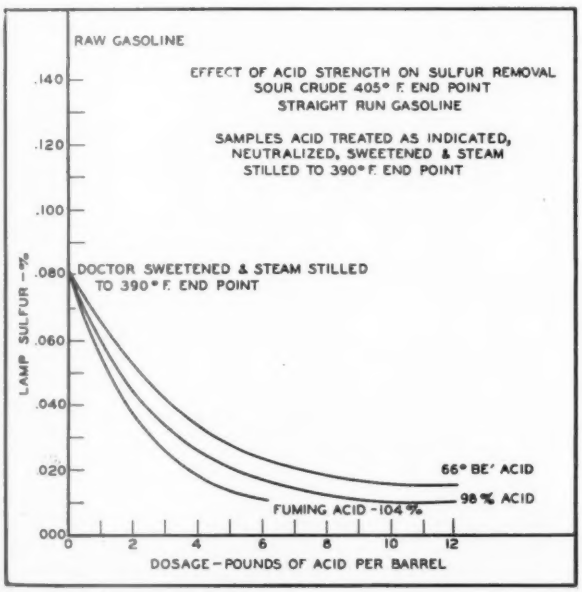

RAW GASOLINE
EFFECT OF ACID STRENGTH ON SULFUR REMOVAL
SOUR CRUDE 405° F. END POINT
STRAIGHT RUN GASOLINE
SAMPLES ACID TREATED AS INDICATED, NEUTRALIZED, SWEETENED & STEAM STILLED TO 390° F. END POINT
DOCTOR SWEETENED & STEAM STILLED TO 390° F. END POINT
66° BE' ACID
98 % ACID
FUMING ACID - 104 %
LAMP SULFUR - %
DOSAGE - POUNDS OF ACID PER BARREL

Fig. 4

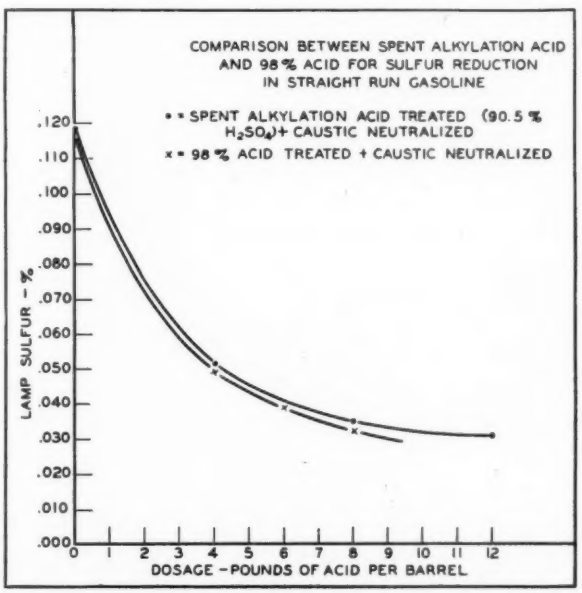
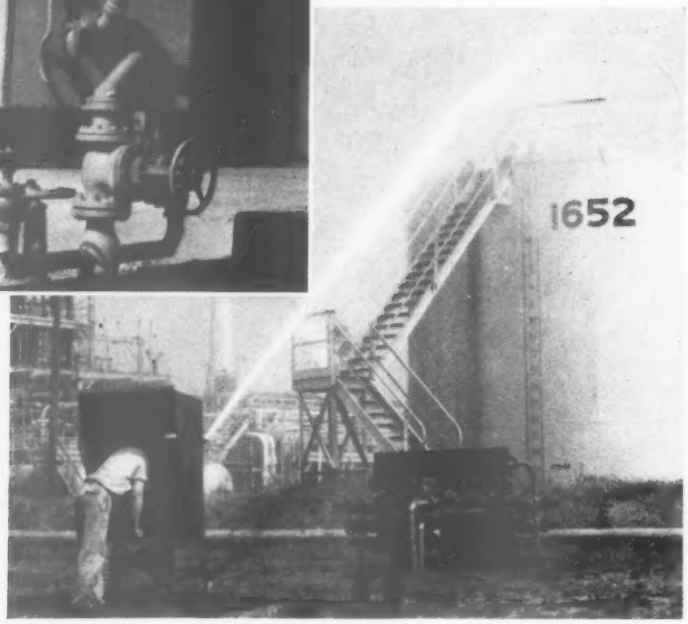

COMPARISON BETWEEN SPENT ALKYLATION ACID AND 98 % ACID FOR SULFUR REDUCTION IN STRAIGHT RUN GASOLINE
• = SPENT ALKYLATION ACID TREATED (90.5 % H_2SO_4) + CAUSTIC NEUTRALIZED
x = 98 % ACID TREATED + CAUSTIC NEUTRALIZED
LAMP SULFUR - %
DOSAGE - POUNDS OF ACID PER BARREL

Fig. 5

PLANT PRACTICES

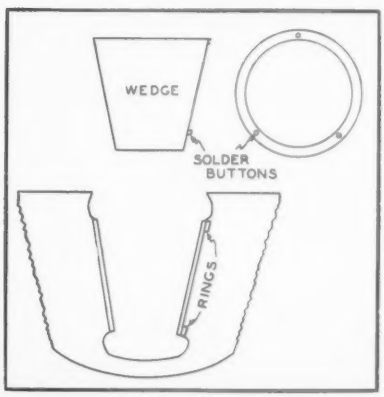


Fire Nozzle and Shield Protect Fire Fighter

AS protection for the operator of a fire nozzle fighting a refinery fire, the accompanying shield is self-explanatory. The shield proper is made of transite, smooth boards at front and sides, corrugated board on top. The hood or shield is attached to the nozzle by braces, arranged in such manner that the entire assembly above the gate valve can rotate through about 180° horizontally, and about 90° vertically, giving wide flexibility in use. A control handle is attached to the nozzle base and extends rearward to enable the operator to direct the nozzle stream. The shield is slotted in front for vision. The two side outlets below the main gate valve are for attaching auxiliary hoses to be supplied with water from the same fire main.

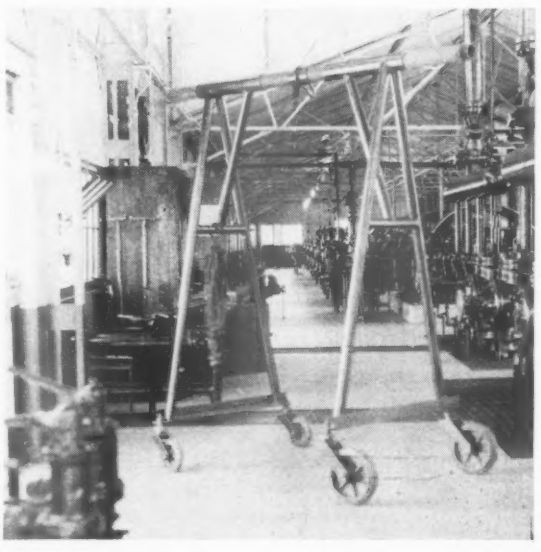
Repairing Gate Valves

WHEN repairing valves of the gate type, it is often necessary to refit wedge and seat rings; machining of ring and wedge faces is necessary, which allows the gate to drop too far through the valve opening because of the widened distance between ring faces. Ring seats are removed and annular rings placed behind them in the valve body, forcing them outward to reduce the wedge opening to the desired degree. When fitting new or reconditioned wedges in gate valves, "hills" of solder are built up on one wedge face equidistantly — 120° apart — to a height of $\frac{1}{16}$-in. or more. The wedge is driven into the valve body with a maul until these solder buttons are flattened and form, with the opposite seat, an exact reproduction of the taper of the body seat rings. The wedge is placed in a lathe and set true with the solder buttons using a dial indicator. Experience indicates the amount of metal to remove from the wedge face, and after its removal the face is lapped to remove tool marks, giving a practically perfect fit of wedge and seat.



Portable Crane-Hoist for Pulling Pistons

A LIGHTWEIGHT crane mounted on small wheels or rollers and supporting a chain hoist is useful for pulling pistons and lifting heavy parts when overhauling or repairing gas engines and compressors. The unit shown consists of an A-frame constructed in the plant shop from piping. It can be rolled around easily to any part of the plant and straddles the equipment to be handled. With it, the pistons or other heavy equipment and parts can be rolled into the plant shop for repairs without further lifting or handling.



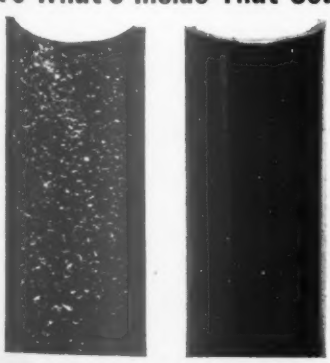
SABOTEUR?

Nearly every string of drill pipe has its saboteurs—but the drilling crew is seldom aware of their presence until the damage has been done. Examination of the pipe at the point of failure as a rule reveals the culprit in his true light—internal corrosion pits, fatigue cracks, faulty wall sections, or extreme body wall reduction caused by internal corrosion and external abrasion. Without close and scientific examination before the pipe is run in the hole, none of these insidious defects can be detected until it is often too late to avert a costly fishing job, or perhaps the loss of the hole. Tuboscope, the modern scientific internal tubular inspection service, reveals the hidden weak points in your drill pipe before drilling begins. The internal walls of each joint of pipe are thoroughly cleaned, powerfully illuminated and magnified to permit close visual inspection by highly trained operators. External gauging to determine body wall reduction completes the examination. The entire string is then sorted, according to its actual condition, and graded as "Good", "Reasonably Good", "Fair", (still usable under special drilling conditions), and "Bad and Dangerous To Use".

DON'T JUNK YOUR PIPE OR RE-TOOL JOINT UNTIL IT'S TUBOSCOPED

Good and reasonably good joints of drill pipe are frequently found in drilling strings with 100,000 or more feet of hole to its credit. With steel at the head of the list of critical materials, it behoeves every operator to Tuboscope his pipe before discarding it. Experience gained from hundreds of internal tubular inspections indicates that it is equally sound practice to Tuboscope drill pipe before installing new tool joints, thus saving the cost of new tool joints installed on worthless pipe.

It's What's Inside That Counts!



The cause for drill pipe failure can seldom be detected on the outside. Here is a section of pipe removed from a joint condemned by Tuboscope. The internal wall was deeply corroded while the external wall showed no sign of deterioration.

TUBOSCOPE
PATENTED

Ventura, California
Houston, Texas
Odessa, Texas
New Iberia, Louisiana
Oklahoma City, Okla.
Great Bend, Kansas

MOST AXELSON CUSTOMERS KNOW

We *are* serving two masters

SINCE DECEMBER 7, 1941, AXELSON HAS DOUBLED ITS PERSONNEL AND MANUFACTURING FACILITIES TO SERVE UNCLE SAM AND THE OIL INDUSTRY

Like all other good, loyal manufacturers, when the war call came we took off our coats here at Axelson and pitched in. The demands of the armed forces and munitions-making industries came above all else. We must, we *will* do everything possible to speed the day of victory.

But all the while we never have forgotten our obligations to the oil industry. For petroleum products are just as essential to the winning of the war as ordnance. Today, more than at any time since Pearl Harbor, we are making every conceivable effort to meet the unprecedented demands of oil producers for more pumps and equipment, so that petroleum production may continue to increase, so that our navy, our air forces, our war plants will never want for a moment in their needs for oil and gasoline.

Thus we say, and with appreciation, that most of our customers know we serve two masters, and will for the duration. Both are important masters, too. Government demands for oil are so great that those governing priorities are beginning to relax a little. We still don't get all the material we could use, but we can take care of many of your pumping requirements with the world's best pumps and sucker rods.

Axelson still builds a better pump

For more than half a century Axelson has been developing and building pumps—better pumps—for better service. Every oil producing field in the world has used them and found this to be true.

Despite priorities, shipping delays, material shortages and all the odds confronting wartime production, Axelson is still building better pumps. New methods and new processes have been worked out to continue the delivery of customer satisfaction. Veteran craftsmen have combined their efforts to produce more serviceable results, without loss of traditional Axelson quality.

Yes, Axelson still builds better pumps, and we can prove it.

FOR VICTORY—*BUY U. S. WAR BONDS*

Axelson

MANUFACTURES AND *SERVICES* DEEP WELL PLUNGER PUMPS AND SUCKER RODS

AXELSON MANUFACTURING COMPANY
Post Office Box 98, Vernon Station, Los Angeles 11, California
50 Church Street, New York City 7 • St. Louis, Missouri • Tulsa, Oklahoma

Mid-Continent and Eastern Distributor: FRICK-REID SUPPLY CORPORATION
Rocky Mountain Distributor: GREAT NORTHERN TOOL COMPANY
Foreign Distributors: AXELSON MANUFACTURING COMPANY
Avda, Pte., R. Saenz Pena 832, Buenos Aires, Argentina
INDUSTRIAL AGENCIES, LTD., 7 High St., San Fernando, Trinidad, British West Indies
C. C. MCDERMOND, Apartado 331, Maracaibo, Venez.

Rapid Extraction Methods May Yield More Oil in Fields Producing Much Water

*by S. F. Shaw**

As a result of his experience in many oil fields, the author questions the theory that regulated production is invariably the most effective method of removing oil from reservoirs. This article does not advocate a change from present methods in all fields but points out that if production is to be greatly stepped up because of war demands, there are some fields in which output could be increased greatly without reducing ultimate recovery. Conversely, it follows that in many others damage might result from increasing production.

FACTS are gradually accumulating which tend to indicate that rapid extraction methods result in increasing the ultimate recovery of oil in many fields, and it seems likely that this method will continue to be employed as long as profit is the motive that impels anybody to produce oil. No dogmatic assertion is made that this applies to all fields, but the number of types of fields in which it appears definitely to be applicable is steadily increasing.

Rapid recovery is associated closely with demand, price and spacing. When demand exceeds the producible supply the price usually is high, and at a time when both demand and price are high, close spacing is economically justified. Close spacing is essentially a means of permitting rapid withdrawal of oil from a reservoir, particularly when wells are limited in individual capacity. Close spacing also permits more rapid withdrawal in large wells if high capacity equipment can be employed, although when employing high capacity methods it is not so necessary to space the wells as closely as when using lower capacity methods.

Some 15 to 20 years ago we passed through a period when wells along the Gulf Coast, in California and in the Mid-Continent produced oil as rapidly as possible, and when comparing the results so far obtained the advantages of that method, other than the impact on price, appear definitely to favor rapid recovery. Since that time we have been passing through a period of low prices and low withdrawals of oil because demand was low compared with the producible supply. Under this condition, large economic losses have been suffered by the operators, and crude oil has been used for inferior purposes, and yet it seems to have been necessary to restrict production to avoid causing a large number of the operators now engaged in this business to be wiped out completely. Indications now point toward a closer balance between demand and producible supply, and the question of withdrawal rate comes up for reconsideration.

During the past 10 years much argument has been offered to support the theory that low withdrawals result in lower production of gas per barrel of oil and in a slower and more uniform advancement of water along the edge of the field, and the deduction is drawn that this results in higher ultimate recovery. These are pure theories as yet, none of which has as yet been proven from actual field experience, whatever be the conclusion drawn from laboratory studies. Even if less gas per barrel be produced at one time, this does not prove that later there will not be a greater gas-oil ratio applying to the deferred oil because of holding it back, as seems to be the case in the Turner Valley field, Canada. We have seen theories advanced based solely on laboratory studies, only to see them disproven almost before they could be published. The fact remains that we are far from understanding all of the factors that control the movement of oil in a large reservoir. Our theories might be compared with Boyle's law which applies to a perfect gas, but from which nearly all gases found in nature deviate. It is very difficult to compare the performance of one reservoir with that of another reservoir, because the conditions in reservoirs vary greatly, and yet the best comparison that lies within our power to make is that the performance of one field, to another apparently similar, but this comparison must await the depletion or near depletion of two such fields for confirmation.

We are told that rapid extraction wastes gas and interferes with control of natural water drive, and yet we have the classic examples of Powell and Wortham where production is

Westgate Oil Co. 1 Carey, Oklahoma City, Okla., which made 5,000 bbl. per day on combination gas lift and centrifugal pump

*Associate professor, A. & M. College of Texas.

from the Woodbine sand and where close spacing and very rapid withdrawal have resulted in recovery close to 80 per cent of the total reservoir contents, if we can accept the methods of computing recovery that are now employed.[1] We have seen extraordinary high recovery already obtained at Seminole and Tonkawa where withdrawals were as near the maximum as operators knew how to bring them about, and these fields are still producing important quantities of oil. We have noted the comparisons in California fields where close spacing and rapid withdrawals appear to indicate very much larger recoveries than from areas with wider spacing.

The purpose of this article is primarily to call attention to instances where rapid withdrawals in the later life of oil wells have recovered oil that seemed likely never to have been recovered if large capacity methods had not been employed. These instances would appear to apply to other fields under similar conditions, and when these large capacity methods can be followed, these other fields probably can be made to yield not only higher ultimate recoveries but also result in greater profit to the operator. This may apply to the early life of some oil fields, such as Tonkawa, Seminole and Powell. A study of early practices along the Gulf Coast leads to the suspicion that high rates of withdrawal resulted in higher ultimate recovery in those fields.

There now seems to be increasing anxiety in the mind of the oil industry that our reserves are not as high as has been generally supposed, and that greater efforts must be made to discover new fields, else we may find ourselves in acute need for oil. If the war should continue for a considerable length of time, we may even find the nation imperilled through not having adequate producible reserves. This is important to consider; we must remember that oil is not necessarily discovered in large quantities just because we need it and by merely starting a campaign of exploration. There is usually a considerable lag between making a start and getting results. We may need to employ methods of extracting the oil from known fields at a much more rapid rate, irrespective of the matter of ultimate recovery. Now is the time to give careful attention to this subject before it is "too late," and before the quantity of oil is "too little" to produce at all.

High-Recovery Fields

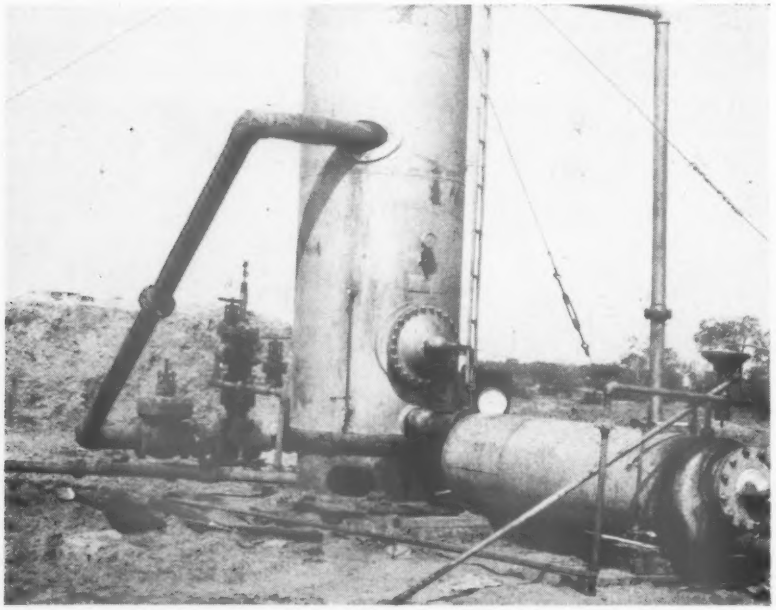
Fields to which attention can be called for the purpose of indicating that rapid withdrawals resulted in higher ultimate recovery are found on the Gulf Coast, in West Texas, Oklahoma, Kansas and Illinois, and these fields serve as excellent examples of what might be accomplished in many other fields.

Along the Gulf Coast, among fields in which water encroachment was rapid, there may be mentioned Flour Bluff, Refugio, Saxet[2] and Saxet Heights.[3] At Refugio, the 3,200-ft. sand was largely depleted so far as conventional pumping methods were concerned. Gas under sufficient pressure at a low price is available from gasoline plants to lift the fluid from these wells which are now producing about 95 per cent water or even more. When the oil content of the liquid declines to a low point, unless this water is lifted at the rate of at least 2,000 to 3,000 bbl. per day it would be impossible to recover enough oil to make the operation profitable. Several wells have been handled at higher rates than 2,000 to 3,000 bbl. per day and as the percentage of oil declines the greater must be the rate of withdrawal to make the operation yield a profit. The casing usually is 7-in., and 3-in. tubing is employed as the flow pipe through which the fluid is lifted. Not only is oil recovered from these gas-lift wells, but the removal of water probably has made it possible for some of the pumping wells to continue which otherwise would be drowned out by the flood of water.

Flour Bluff.—In the Flour Bluff field, a well 6,665 ft. in depth was flowed through tubing at depth of 4,600 ft. Salt water made its appearance, and in order to make the allowable the well was produced continuously through the tubing by gas lift, and under these conditions only 150 bbl. per day could be lifted through this small pipe. In the course of time, while producing at this low rate, salt water increased to nearly 100 per cent. Valves were inserted in the tubing so that this well could be produced at depth of 6,391 ft., and under this condition production increased to 400 bbl. of liquid, and the oil content rapidly increased to 14 per cent of the liquid. After producing in this manner for some months with the oil percentage gradually increasing, the well finally reached the point where it resumed production on natural flow.[4] This example serves to illustrate the effects of a well loading up with salt water when produced at a low rate, and indicates the advantage of increasing the flow, thereby increasing the daily withdrawal, and thus logically increasing the ultimate recovery.

Hendrick field.—In the Hendrick field, Winkler County, Texas, it was reported a year or two ago that a few wells were produced on gas lift and made as high as 20,000 to 25,000 bbl. of liquid per day with ½ per cent oil.[5] Only by producing such large quantities of liquid was it possible to show a profit; and without a profit it is customary to close down or abandon such wells, irrespective of whether or not it affects ultimate recovery.

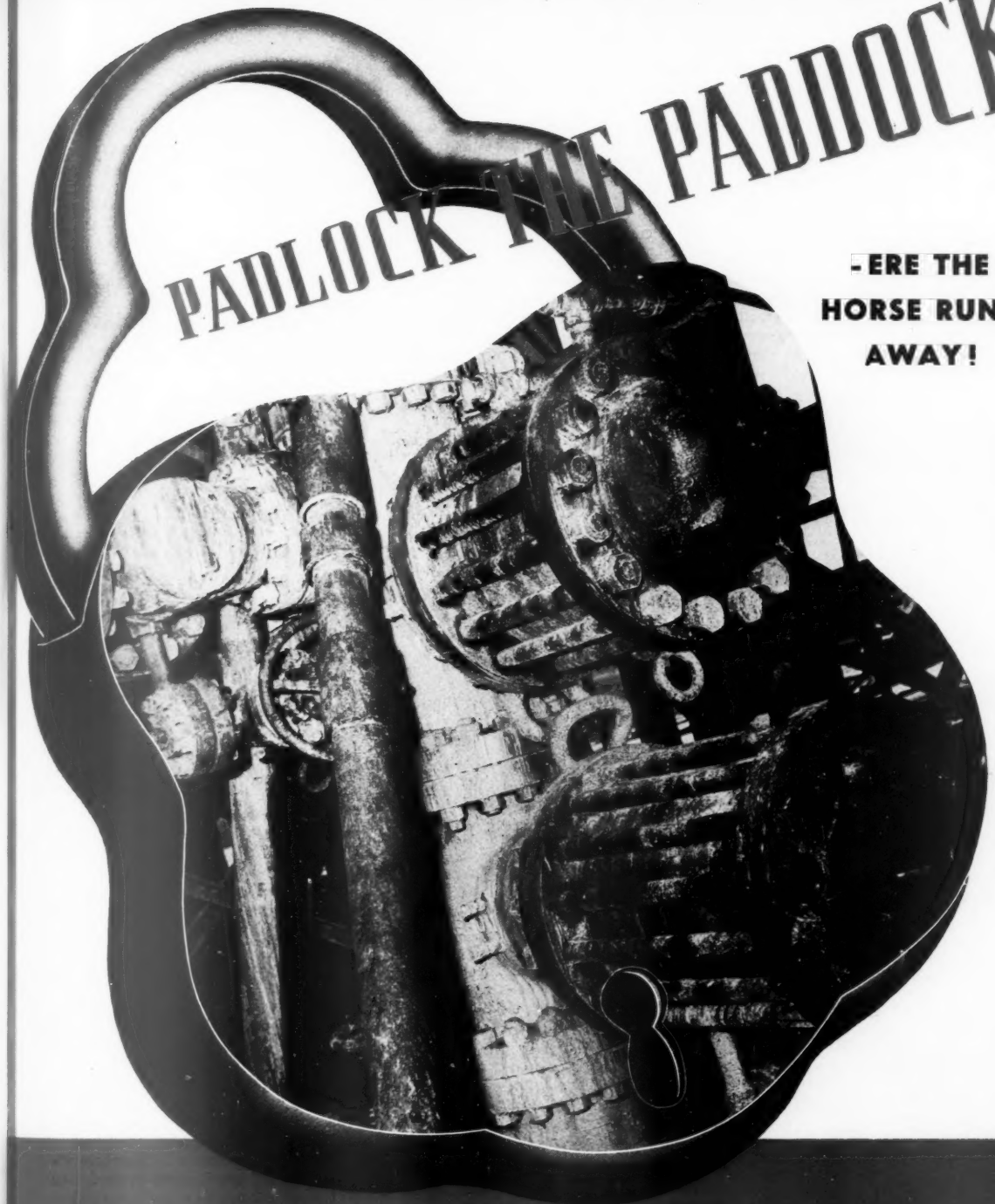
Oklahoma City field.—Oklahoma City became noted for the large quantity of oil that could be produced by straight gas lift from depth of 6,500 ft., and later by the combination gas-lift-centrifugal pump method, by which method production from several wells was as much as 5,000 bbl.



Westgate-Greenland 1 Sturm, Corpus Christi, Tex., which made up to 4,000 bbl. of fluid per day on straight gas lift

PADLOCK THE PADDOCK

-ERE THE HORSE RUNS AWAY!



The folly of drilling wells with inferior or inadequate drilling control equipment has been proven time and again. Numerous costly and disastrous blowouts can be traced directly to this cause.

To date, not a single well, equipped with Cameron Pressure-Operated Drilling Control Units of *adequate* capacity, has been lost due to failure of those units. On the other hand, thousands of wells, including approximately 95% of all wells completed below 10,000 feet, have been drilled through Cameron equipment.

The obvious conclusion and the opinion of most safety-conscious operators is that Cameron Pressure-Operated Drilling Control Units—4000 Lb. Test Models for depths not exceeding 7000 feet; 6000 Lb. Test Models for depths exceeding 7000 feet—are the world's most dependable protection against destructive well pressures.

To *complete* deep, high pressure wells with the same superlative safety, Cameron engineers have perfected the "Closed Pressure Method of Well Completion" as an adjunct to its drilling control method. An illustrated brochure, presenting these operations step-by-step, will gladly be sent to interested operators on request.

CAMERON IRON WORKS, INC.

711 Milby St., Houston, Texas. *Export:* 74 Trinity Place, New York, N. Y. *California:* The Howard Supply Co., Los Angeles. *Rocky Mountain:* Mountain Sales & Service, Casper, Wyo.

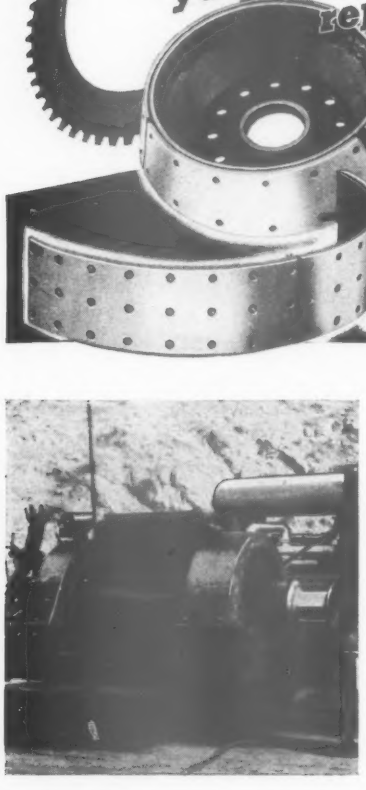
of oil per day at a period when straight gas lift was capable of handling only 500 to 1,000 bbl. per day. Total profit undoubtedly was greater as a result of lifting oil in large quantities, but it would be difficult to prove that this rapid withdrawal at Oklahoma City resulted in higher ultimate recovery. The writer believes that such is the case, but cannot support it with definite figures. However, Oklahoma City was a gas-drive field and it is not unreasonable to suppose that less oil ultimately would have reached the wells if a slower rate of withdrawal had been employed accompanied by resultant higher bottom-hole pressures and, therefore, by lower differential pressures through which gas expansion would have taken place, under which condition the propulsive energy contained in the gas would have been much reduced, as discussed in a later paragraph in this article. On the other hand, lifting of large volumes in the Simpson dolomite zone and other sand zones in this field, seems definitely to have increased ultimate recovery because many of these wells were close to the point of abandonment, and additional recovery made possible by high capacity methods appears definitely to indicate that a higher recovery has been obtained. Fluid levels were too low to allow economic use of the gas-lift method in the Simpson sand, moreover the gas being recycled became so contaminated with air that corrosion of tubing and casing was rapid and made for prohibitive expense for making tubing renewals. It was necessary, therefore, to employ the electrical centrifugal pump in the later life of these Simpson sand wells.

A record of the performance of 15 wells in the Oklahoma City field over a period of 6 months in 1937[6,7] indicated that 4,561,726 bbl. of liquid were produced, of which 393,901 bbl., or 8.6 per cent, was oil. The amount of power consumed was 2.15 kw.-hr. per bbl. of fluid, or 25 kw.-hr. per bbl. of oil. Some wells placed on centrifugal pump during later years were ready for abandonment before being produced by this method, and the oil would probably have been lost had not these pumps been installed.

St. Louis field, Oklahoma.—A surprising development resulting from rapid withdrawals is that at St. Louis, Oklahoma. Much of the production comes from the Simpson limestone formation where sulfur gas makes gas lift difficult and costly to employ, therefore, centrifugal pumps driven by electric motors are employed for handling wells that have capacity greater than the beam pumps can handle.

By the summer of 1933, the St. Louis field was producing so much water that it was not considered profitable to drill any more wells. Low price of oil, of course, was a serious obstacle. About 1937, there was started a new drilling campaign caused by the discovery that these flooded areas would produce important quantities of oil when the wells were produced at large daily rates. One well newly drilled was on the point of being abandoned without setting casing because the formation was running low, but with large capacity methods becoming available it was decided to complete the well, and the initial production was 1,862 bbl. of fluid of which 1,382 bbl. was oil. "Decline was rapid, but oil production stayed near 600 bbl. of oil per day for a long time. This practice has made it possible to recover from water-invaded areas millions of barrels of oil which would necessarily have been lost under former production methods."[8] In 1939, consumption of power when using the centrifugal pump was 1.32 kw-hr. per bbl. of liquid, or 14.7 kw-hr. per bbl. of oil, and the percentage of oil averaged 9.0 per cent of the quantity of fluid lifted.

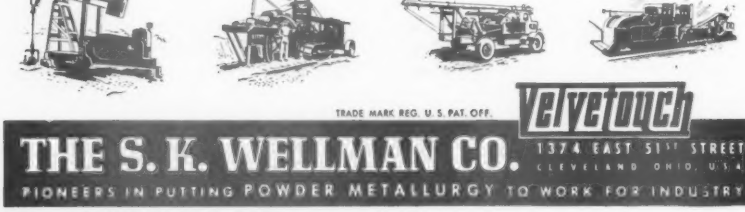
In 1935, there was an average of nine wells being produced by centrifugal pump in the St. Louis field; in 1931, 61 wells were being so produced.[9] Data on the performance of



VELVETOUCH is an all-metal friction material — a combination of sintered powdered metals, welded to a solid steel backing. It is engineered to wear many times longer than ordinary clutch facings and brake linings . . . requires fewer adjustments and replacements.

In operation, Velvetouch is smooth and positive. It is not affected by oil, heat or water. Clutches and brakes equipped with Velvetouch never chatter, never slip.

Specify Velvetouch for your rotary drilling rigs. Install it on your draw works, portable drilling rigs, ditchers, side-boom pipe handling equipment . . . wherever you have a clutch or brake maintenance problem!



TRADE MARK REG. U. S. PAT. OFF.

Velvetouch

THE S. K. WELLMAN CO. 1374 EAST 51ST STREET CLEVELAND OHIO, U.S.A.

PIONEERS IN PUTTING POWDER METALLURGY TO WORK FOR INDUSTRY

these pumps in 1937-39 are given in Table 1.

In December 1940, 22 wells were producing on beam pumps, from which the combined production of fluid was 13,926 bbl. per day, of which quantity 2,067 bbl., or 14.9 per cent was oil. Centrifugal pumps were substituted and 47,887 bbl. of fluid were lifted per day, of which 8,041 bbl., or 16.8 per cent was oil, and production was increased to more than three times that lifted when producing by conventional lifting methods. The percentage of oil in the fluid was increased about 2 per cent because of producing the fluid at a more rapid rate. Table 2 gives the individual wells making up this performance.[9]

Another list of wells in various fields which were changed from conventional production methods to a method by which daily withdrawals were much increased is given in Table 3.

Dupo field, Illinois.—A field that has shown large increase in ultimate recovery by reason of rapid withdrawals is Dupo, St. Clair County, Illinois, which was discovered in 1928, and was followed by a town-lot drilling campaign.[10] "Operations continued for about 10 years with regular decline in production. Some wells became unprofitable due to the large volume of water, and others became strippers making from 1 to 3 bbl. per day, and the town-lot wells were mostly abandoned." In July 1939 one of these wells was pumping 3,000 bbl. of water per day but made no recoverable oil. A centrifugal pump was installed in May 1940, and started pumping 5,800 bbl. of fluid per day and gradually increased the production of oil and in about 3 weeks the production was 365 bbl. of oil per day. Other old wells were cleaned up and some new wells were drilled. "During the first 4 months of 1940 the entire field produced a total of 40,000 bbl. of oil; during the next 4 months, 93,000 bbl. were produced, and during the first 4 months of 1941, 80,000 bbl. were recovered. The final 4 months of 1941 showed a production of 140,000 bbl. of oil." From May 1940 to September 1941, the production from 13 wells on centrifugal pump was 183,125 bbl. of oil, an average of 356.8 bbl. daily. As much as 6,000 bbl. of fluid per day were being handled through 7-in. casing. Average costs were said to be 68 cents per barrel of fluid, and 18.9 cents per barrel of oil. Average cost of electric power included in the above costs was 1.68 cents per kilowatt-hour. This seems to be a definite instance of large increase in recovery being made by speeding up production, much of which would probably have remained in the reservoir had not a high capacity method been employed.

Theories Pertaining to Low and High Withdrawal Rates

The question naturally comes to mind as to why it should be thought that restriction in production will yield a greater ultimate recovery when such instances as the foregoing can be cited. These instances are not theories but actual performances, and if actual performances bring forth such results how can we successfully offer the theory that restricted yield results in higher ultimate recovery? True it is that laboratory experiments have shown contradictory results. Uren points out that experiments indicated a higher yield in water flooding when the flow was not too great.[11] Laboratory tests made by the Geologic Standards Co. seemed to indicate that under certain conditions, a slower rate of extraction resulted in higher recovery. On the other hand, laboratory tests made by Frank G. Miller[12] indicated that up to some optimum rate, rapid flow through the sand results in higher ultimate recovery.

Laboratory experiments are made under artificial conditions, and it seems advisable to ascertain how engineers who have had considerable experience in water flooding view the matter. A paper written by Harry M. Ryder[13] points out that rapid withdrawals in the Bradford field, Pennsylvania, yield higher recovery than slow withdrawals. Perhaps again the matter of economics affects the situation materially. If the rate of withdrawal is so slow that no profit results from the operation, the whole program bogs down, and the process invites no one to undertake to carry it out. This discussion refers to artificial water flooding; how about natural flooding? Again if the withdrawal is so slow that operations must be discontinued, then ultimate recovery is reduced. That would seem to be clear. The higher the rate of withdrawal, the greater is the profit, providing a method is employed that does not involve excessive lifting costs. In natural water flooding the question arises as to whether the withdrawal of large quantities of water does not reduce the percentage of oil in the fluid. Experience seems to indicate that if there is any change in the oil percentage of the fluid within a short time after increasing the withdrawal, the more likely it is that the percentage of oil will be increased rather than reduced. Note the effect on oil percentage in the St. Louis pool where the per cent of oil was 14.9 per cent with a production of 13,926 bbl. of fluid per day, and was 16.8 per cent when the production of fluid a month later was 47,800 bbl. The practice in the Dupo field, Illinois bore out this same result.

These seem to be the facts; what are the reasons? This is difficult to answer, but we do know what-

TABLE 1

Data on Performance of Centrifugal Pumps in the St. Louis Field, Oklahoma

Year—	No. wells on centrifugal pump	Bbl. produced during the year		Per cent oil	Electric energy used		
		Fluid	Oil		Total kw. hr.	Kw.-hr. per bbl. Fluid	Kw.-hr. per bbl. Oil
1937	37	19,725,680	1,708,341	8.7	27,971,027	1.42	16.4
1938	39	22,509,611	1,837,735	8.2	28,826,692	1.28	15.7
1939*	58	15,630,148	1,401,678	9.0	20,632,978	1.32	14.7

*Six months.

TABLE 2

Increase in Production of Oil and in Percentage of Oil by Increasing Daily Withdrawal

Company and well—	Bbl. fluid produced per day		Bbl. oil produced per day		Per cent oil in liquid	
	Beam pump	Centrifugal pump	Beam pump	Centrifugal pump	Beam pump	Centrifugal pump
Amereda Pet. Corp. 2 Harrison	940	1,960	40	110	4.3	5.1
Amerada Pet. Corp. 5 Harrison	815	2,135	35	135	4.3	6.3
Arkoma Oil Co. 1 Bean	560	2,200	60	400	10.7	18.2
E. J. Bowmaster 3 Brister	275	2,460	25	660	9.1	26.8
Creslenn Oil Co. 1 Mitchell	783	2,465	83	265	10.6	10.8
Carter Oil Co. 1 Monnett	450	4,450	50	430	11.1	9.7
Carter Oil Co. 2 Monnett	351	2,375	15	215	4.3	9.2
Denver P. & R. Co. 1 Richard	1,430	2,400	30	200	2.1	8.3
Mid-Continent Oil Corp. 2 Vieux	520	1,540	120	340	23.1	22.1
Maebris Oil Co. 2 Brown	1,200	2,275	125	375	10.4	16.5
Magnolia Pet. Co. 1 Billington	325	1,836	75	300	23.1	16.3
Magnolia Pet. Co. 2 Billington	870	1,800	240	500	27.6	27.8
Magnolia Pet. Co. 3 Hilton	650	2,260	50	260	7.7	11.5
Phillips Pet. Co. 1 M. F. Reade	232	1,700	22	200	9.5	11.8
Phillips Pet. Co. 4 N. Bruner	240	1,164	75	264	31.0	22.7
Phillips Pet. Co. 3 Garrett	1,100	2,387	500	1,187	45.5	49.7
Shell Oil Co. 1 Mitchell	600	2,089	100	489	16.7	23.4
Shell Oil Co. 2 Hines	700	1,752	100	372	14.3	21.4
Skelly Oil Co. 2 Decker	670	2,744	70	344	10.4	12.5
Sinclair Prairie 3 Gilbreath	425	1,950	100	450	23.5	23.1
Sinclair Prairie 2 Deatherage	640	1,800	140	400	20.2	22.2
Tilico Oil Co. 2 Wyatt	150	2,145	12	145	8.0	6.6
Total	13,926	47,887	2,067	8,041	14.9	16.8

TABLE 3

Increased Production Resulting From Increased Withdrawals in Various Fields

Company and well—	Date installed	Bbl. fluid produced per day: Beam pump	Bbl. fluid produced per day: Centrifugal pump	Bbl. oil produced per day: Beam pump	Bbl. oil produced per day: Centrifugal pump	Per cent oil in liquid: Beam pump	Per cent oil in liquid: Centrifugal pump
Kansas							
Phillips 9 Scully	1- 3-30	2,290	3,264	90	124	4.2	4.2
Phillips 4 Paris	5-10-35	1,256	1,916	56	81	4.5	4.5
Phillips 61 Alvin	9- 1-38	1,223	6,387	23	122	1.8	1.8
New Mexico							
Texas 1-A State	11- 3-38	1,080	1,855	270	780	25.0	43.3
General Crude B-1 State	2-26-34	775	1,721	175	521	22.5	30.4
Oklahoma							
E. W. Jones 3 Green	6-15-37	*240	1,550	40	350	17.0	22.5
DenverP. & R. 1 A. Zoller	9-27-38	1,875	2,708	75	278	4.3	10.0
Deep Rock 2 Cherry	11-22-38	310	1,285	10	285	3.5	23.5
Hilton-Phillips A-1 Bettis	2-20-41	325	1,600	25	800	7.7	50.0
Reda Pump 1 R. & F.	9-17-42	310	2,089	10	189	3.5	9.0
Texas							
Phillips B-2 Hendrick	4-29-31	1,480	3,620	80	420	5.5	11.6
Stanolind 8-88-U	1- 9-32	1,706	3,488	46	233	2.5	6.5
Texas 4 J. M. Perry	6- 2-32	616	1,440	16	300	2.6	21.5
Total		14,486	32,923	916	4,483	6.3	13.6

*On swab.

ever gas is dissolved in the oil, that accompanies this large quantity of fluid, possesses greater energy in expanding from a high pressure to a low pressure, than when expanding from a high pressure to a medium pressure. For example, 1 cu. ft. of gas expanding from 400 lb. per sq. in. to 200 lb. per sq. in. performs 1,393 ft.-lb. of work, whereas a cubic foot of gas in expanding from 400 lb. to 50 lb. delivers 3,932 ft.-lb. of work; that is, the foot-pounds of work in 1 cu. ft. expanding to the lower pressure is as great as in 3 cu. ft. when expanding through the lesser range to a medium pressure. This energy is expended in driving the fluid toward the well.[11] To illustrate with an example; if a well has a static bottom-hole pressure of 400 lb. per sq. in. and is produced at a slow rate such that the producing bottom-hole pressure falls to 200 lb. per sq. in. each cubic foot of gas produced will perform 1,393 ft.-lb. of work in moving oil toward the well. If this same well is produced at a high rate such that the producing bottom-hole pressure falls to 50 lb. per sq. in., each cubic foot of gas produced will perform 3,932 ft.-lb. of work in moving oil toward the well. Thus, unless the gas-oil ratio at the slow rate of production is less than one-third that at the high rate of production, a net loss of total gas energy is being suffered by employing the slow production rate. In all fields in which gas is a motive force this could easily result in lower total recovery of oil.

Another reason that may be suggested is that oil trapped in upper inequalities in the formation is forced by its dissolved gas out of its trap into the stream of fluid moving toward the well when the pressure is reduced. This may account not only for the increase in total oil content lifted, but in increase in the percentage of oil. An instance is cited of a well in a limestone reservoir that had been making 350 bbl. of fluid of which 50 bbl. was oil. A centrifugal pump was installed and the withdrawal was increased to 1,600 bbl. per day of which 800 bbl., or 50 per cent, was oil, and this rate of production continued for a considerable period of time.

Limestone formations have openings, some large, some small, and a large cavern in the upper part of a reservoir might easily contain a large quantity of oil which would never be recovered unless either a well happens to be drilled into this cavern, or unless the pressure is lowered in the reservoir by high withdrawals from the surrounding wells to the point where this cavern can be emptied of its oil contents.

Connate Water

We have heard the remark made that the water in a natural flood flushes the oil from the sand grains and carries it to the producing wells. Also we are told that many reservoir rocks contain from 10 to 30 per cent or even more of connate water. If there is connate water present in the sand to this extent that was not displaced by the oil which collected in the reservoir originally, it would seem that the connate water must be the fluid originally wetting the sand grains, in which case the oil is not adhering to the grains of sand and has only to be washed out of the pores in the sand, and the quicker this is done, the greater is the profit, and the cleaner is the sand afterward because of the rapid flow.

It should be clear that the profit motive controls the operation of the well, and if withdrawals be held back excessively, then the profit disappears because of the higher cost per barrel. This was clearly brought out in the Saxet Heights field. A well producing 500 bbl. of fluid per day of which 2 per cent was oil, resulted in a recovery of 10 bbl. of oil per day. Such a well would have to pump day and night to lift this quantity by conventional lifting methods, making for high costs. If the well were not pumped continuously, it would be water-flooded within a few hours, and when pumping is again resumed, there could easily be a loss of several hours before any oil appears. This is not theory; it is happening repeatedly and indicates the advisability of pumping much larger quantity, say 3,000 bbl. or more per day, and even if there is no increase in the percentage of oil in the fluid, the yield would then be 60 bbl. of oil. In the slower operation, the fixed charges would absorb a considerable portion of the revenue.

The facts set out in this article indicate that with our country at war and faced with potential scarcity of producible crude oil, regulations restricting production from at least all fields producing considerable quantities of water with the oil should be removed in the interest of:

1. Immediate increase in daily oil recovery.

2. Increase in total producible reserves.

3. Permitting operators a better profit while recovering the remaining producible reserves.

References

1. Shaw, S. F. Recoveries Obtained Under Different Extraction Methods in Various Fields. Oil Weekly, Dec. 7, 1942.

2. Shaw, S. F. Determination of Productive Capacities of Flow Pipes on Gas Lift. The Oil and Gas Journal, June 17, 1943.

3. Shaw, S. F. Gas Lift Principles and Practices (1939).

4. Cullinan, H. J., Jr. Discussion of Factors Affecting Gas-Lift Production With Perforated Couplings. Paper read before the Gas-Lift Conference at A. & M. College of Texas, Apr. 18, 1941.

5. Stormont, D. H. Gas Lift Now Being Widely Adopted Through Many West Texas Fields. The Oil and Gas Journal, May 4, 1939.

6. Steuve, W. H. Performance of Reda Pumps in Oklahoma City. The Oil and Gas Journal, Feb. 24, 1938.

7. Steuve, W. H. Power Consumed by Reda Pumps in Oklahoma City Fields. The Oil and Gas Journal, Apr. 20, 1939.

8. Sanders, T. P. New Type Secondary Recovery Developed in St. Louis Field. The Oil and Gas Journal, Dec. 19, 1940.

9. Steuve, W. H. Electric Submersible Well Pump Performance in the St. Louis Pool, Oklahoma. Petroleum Engineer, Dec. 1939.

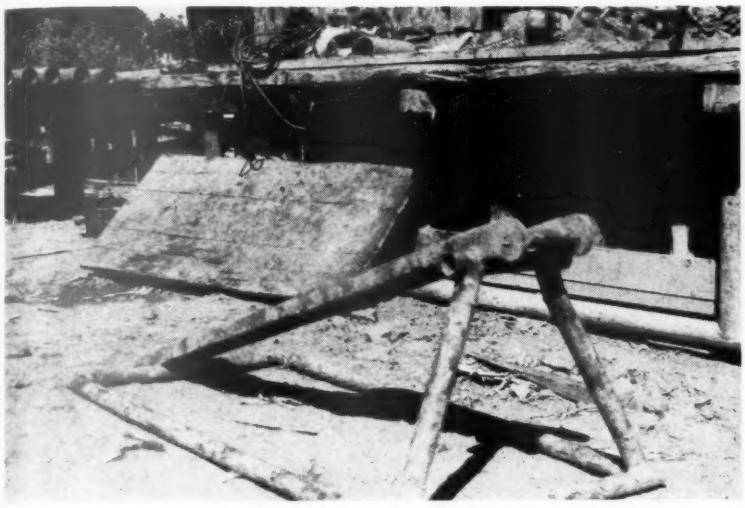
10. Kotschoubey, Victor. New Type Secondary Recovery in Dupo, Illinois, Field. The Oil and Gas Journal, Mar. 5, 1942.

11. Uren, L. C. Petroleum Production Engineering. Vol. 2 (1939).

12. Miller, Frank G. A Laboratory Study of Water Encroachment in Oil-Filled Sand Columns. U. S. Bureau of Mines R.I. 3595 (1941).

13. Ryder, Harry M. The Economic Technology of the Water Drive. Paper delivered at the Tulsa meeting of the American Petroleum Institute, Mar. 26, 1942. The Oil and Gas Journal, Apr. 2, 1942.

OPERATING IDEAS

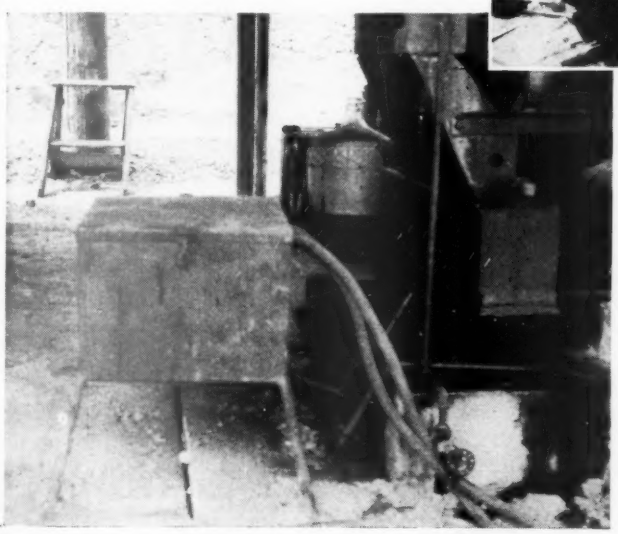


Slide to Prevent Bending Drill Pipe

DROPPING drill pipe from the derrick floor down the ramp to the pipe rack may result in kinking or bending the pipe. To prevent this one company has devised a handy slide. This consists of a rectangle, the size depending on the height of the substructure of the derrick and the height of the floor, above the walk. Risers are attached at one end with a crossmember to which is welded a shallow section of channel iron. A free-rolling spool is welded in at the highest end of the channel iron. The opposite end is fastened to the crosspiece of the pipe rectangle. The slide can be short when a low derrick is used and high if the walk requires a steep ramp from the floor to the pipe rack. A second section of channel iron allows the pin of the tool joint to slide freely without splintering the timbers of the walk so that the joint will pass without being kinked by dropping.

Protection for Batteries in Field Service

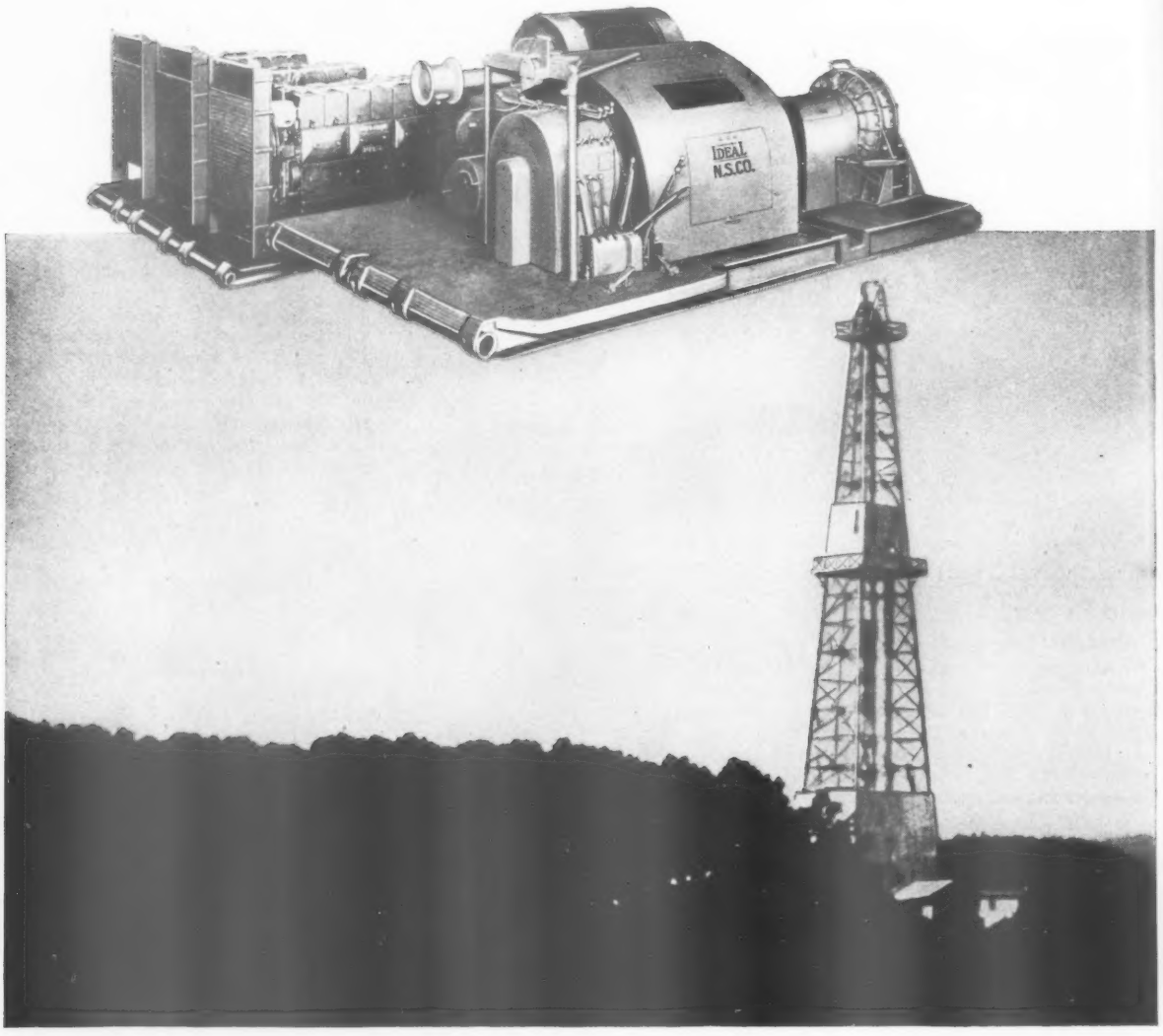
WITHOUT adequate protection, starting batteries for field pumping engine installations deteriorate rapidly and sometimes are lost due to theft. A major California oil company places batteries in substantial cases of light steel mounted on short legs. The case is tailored to fit the battery used at the stations in the field, having a hinged lid fitted with hasp and staple for locking. Wires for the generator circuit pass through small holes in one end of the case, while the starter leads emerge through a slot on one side just below the lid. By standardizing the wiring plan of the electric circuits, a battery with both leads attached can be shipped quickly by a pickup truck from one pump station to another when emergency arises.



Portable Unit for Independent Lighting

WHERE wells are drilled without connections on electric transmission systems for power to operate shale shakers and to illuminate the rig area, a portable unit generating set mounted on a four-wheeled trailer for convenience may be used. The trailer frame is made of wide structural steel, sufficiently sturdy to support the unit without distortion. The axles are obtained from junked automobiles, employing the front axle from two cars of like type. The front axle is fitted with steering mechanism attached to a drawbar having conventional ball-and-socket hitch. The rear axle is spot-welded to prevent the wheels from castering, and are lined up for proper trailing behind the front. The carburetor may be used with natural gas, butane or liquid fuel. The lighting unit is equipped with standard 6-volt battery, generator and starter so it can be put in service as soon as rig wiring is completed and leads connected.

NATIONAL *Type 125* CONSOLIDATED RIG



SEARCHING deeper and deeper into the wilderness stretches of the world, the wildcatter today is helping to meet the wartime oil requirements of America and the Allied Nations in their fight to Victory.

Wherever he goes, National Oil Field Machinery and Equipment accompanies him, for it has long been his partner in much of the world's oil field discovery and development. The distinctive blue of National is a predominating color wherever drillers or pumpers are at work—it indicates the preference for this machinery by men who cannot afford to compromise with quality.

The Type 125 Consolidated Rig shown here is a popular National unit. It is designed for drilling operations where conditions require the use of 4½" drill pipe to a depth of 12,500 feet. Power units supply a total of 950 H.P. to the imput shaft of the Draw Works. Use of a three-engine chain drive compound unit allows for compounding the engines so that their combined power may be used for hoisting operations or for driving the rotary machine and slush pumps at their required speed while drilling.

National Oil Field Machinery and Equipment is designed and built to give the ultimate in service, commen-

★ ★ ★ ★ ★ ★

WITH THE *Wildcatters in the Shadow of the Canadian Rockies*

surate with its rated capacities. The service derived from it is proportionate to the manner of operation and to the care given to upkeep and maintenance.

Keep your equipment clean—inspect it regularly—avoid overloads and excessive speeds—lubricate regularly and thoroughly in accordance with manufacturer's instructions—familiarize yourself with the design and construction of your National equipment. Ask for free Descriptive Bulletins which will give you this information in detail—call on our Engineering and Service Staffs for consultation regarding equipment problems.

The National Supply Company

Executive Offices: Pittsburgh, Pa.

General Sales Offices: Toledo, Ohio. Division Offices: Ft. Worth, Texas; Tulsa, Oklahoma; Torrance, Calif. Export: The National Supply Corporation, 30 Rockefeller Plaza, New York, N. Y., U. S. A.; River Plate House, 12 South Place, London, E.C. 2.

★ ★ ★ ★

Associated Press, passed

THE Oil Man, like the artilleryman, has to hit the bull's eye . . . There isn't any room for guess-work. When it comes to cementing an oil well, you can't miss with Lone Star Cements . . . they are specially made to meet the entire range of oil-field work:

LONE STAR CEMENT for surface work and all-around oil-field service;
'INCOR'* for wells of moderate depth, earlier drill-out, on production quicker.
'STARCOR'* AND 'TEXCOR'* for deep wells, high temperatures and pressures.

Four great Lone Star Cements, each with its own specific uses—with inbuilt extra quality that helps insure the oil-well investment. Ask our nearest Dealer for the Cement that fits your job . . . and remember, too, that our Field Service is always at your disposal.

*Reg. U. S. Pat. Off.

SET YOUR SIGHTS ON THE RIGHT CEMENT TO FIT THE JOB

LONE STAR CEMENT CORPORATION • DALLAS • HOUSTON

Oil-Well Pumping Practices—No. 6

Failure of Sucker Rods

by J. Zaba

This installment continues a discussion that started in last week's issue, in which the author treats such matters as stresses, endurance limits, fatigue, stretch, calculation of loads, etc. Earlier articles in the series, which began July 1, discussed behavior of oil reservoirs and sucker-rod pumping systems.

A STATEMENT was made, in general consideration of stresses and fatigue in the preceding installment of this series, that fatigue, and endurance limit, are affected by maximum stress, range of stresses and number of reversals. Applied to operations of a sucker-rod string, this statement may be interpreted as meaning that fatigue and endurance limit of sucker rods are affected by peak polished-rod load, range of loadings and speed of operation. The effect of peak polished-rod load is obvious. The range of loading is important because as the fluctuation between maximum and minimum loadings decrease the result is a closer approach to conditions of steady loading. The question of speed of operation, if considered from the standpoint of pumping installation as a whole, requires certain compromises, because of effect of speed of pumping on the requirements imposed on the surface pumping equipment. From the standpoint of sucker rods alone, the consideration of speed of operation must include not only the question of reversals and of dynamic loads involved but also the effect on stresses of natural vibration of rods.

Principal cause of sucker-rod body failures is overstressing. Stresses normally safe may be increased in intensity by "stress raisers" or additional stresses may be superimposed on the safe stresses the total exceeding the endurance limit of sucker rods and leading to failure. The mechanism of failure is fatigue, if corrosion is known to be absent, corrosion fatigue, hydrogen embrittlement, or combination of the last two.

In case of sucker rods, the major part of "stress raisers" is contributed by improper field handling. Bending of rods followed by straightening creates tensile and compressive stresses on the surface of the rods. Such bending may be beginning of a microscopic crack, a serious stress raiser. Nicks and dents, caused by hammering or dropping a rod across a sharp object, result in creation of points of stress concentration, the first step of the fatigue failure process. The rods may be damaged by drop resulting from a break or may be overstrained beyond elastic limit in pulling on a stuck pump or plunger. In field practice the possibility of damage by overstraining may be eliminated by using the stretch of rods, caused by the pulling force, as an indication of amount of stress imposed.[1] The maximum allowable safe stretch for rods of given minimum yield point for strings of different length is given in chart shown in Fig. 1. This method may be used if weight indicator is not available.

Additional stresses which added to the usually safe stresses may result in a total exceeding the endurance limit, may be caused by characteristics of the pumping cycle or by faulty operation or characteristics of operations of any of the part of the

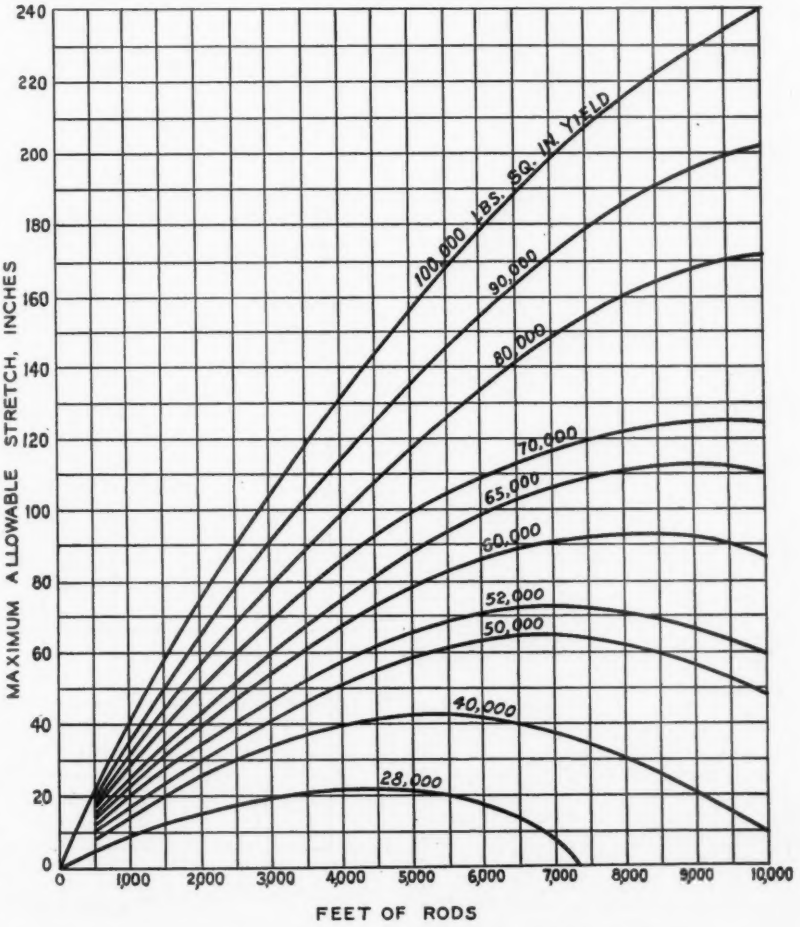


Fig. 1—Maximum allowable stretch of rods—(Copyright S. M. Jones Co.)

pumping mechanism. To the first group would belong stresses resulting from natural vibration of rods. (Installment 3). To the second group would belong stresses caused by fluid pound, those imposed by vibration due to loose bearings of surface equipment, those caused by characteristics of operation of prime mover and others.

By far the most common process of sucker-rod body failure is corrosion fatigue. Fig. 2 shows a typical

Fig. 2—Sucker-rod corrosion fatigue break (Copyright S. M. Jones Co.)

corrosion-fatigue fracture. The base of the corrosion pit, the point of stress concentration, is the starting point of the fatigue crack. The area of the fatigue fracture is smooth, that of tensile break coarse and crystalline. This type of break is quite often referred to as break due to "crystallization" of rod. This expression is erroneous since no change in crystalline structure has taken place or caused the break.

Causes of Failure

As far as coupling failures are concerned, D. R. Dale classifies[3] the causes of failure into four groups: (1) Mishandling in the field, such as hammering of the couplings, (2) faulty grinding during fabrication, (3) surface fatigue cracks, (4) insufficient cross-sectional strength. Of these four groups of causes the third group, the surface fatigue cracks, is the most common one. In oscillating motion of the sucker rods, the couplings are hitting against the tubing. These blows lead eventually to formation of fatigue cracks.

The problem of sucker-rod failures is an economic one, the frequency of failures affecting the useful life of a sucker-rod string. First breaks in a new string of rods are usually a result of some hidden defects or damage in transit.[3] Later breaks are fatigue breaks or are caused by damage to rods in pulling the well. If this type of break becomes too frequent, replacement of rods is necessary, since the cost of pulling jobs, plus cost of replacements becomes prohibitive. Mathematical formulas have been worked out for relation between number of failures and days of services.[4]

TABLE 1—ENDURANCE PROPERTIES OF SUCKER-ROD MATERIALS

Type—	Heat treament,* °F. Quench	Normalize	Draw	Endurance limit, (lb./in.²) Air, AL	Corrosion CL	Sulfide corrosion SL	Ratios CL/AL	Ratios SL/AL
S.A.E. 1035				40,600	24,600	10,600	0.61	0.26
S.A.E. 1050	W 1,550		1,100	66,900	25,600	14,100	0.38	0.21
S.A.E. 3130		1,600		55,100	31,600	15,900	0.57	0.29
S.A.E. 4130	W 1,550		1,150	70,100	26,900	14,100	0.38	0.20
S.A.E. 4615				48,600	33,100	19,900	0.68	0.41
1.25% manganese				48,900	19,600	14,600	0.40	0.30
				†45,800				
1.75% manganese		1,550		56,400	29,400	12,100	0.52	0.21
Toncan iron				36,400	16,900	11,900	0.46	0.33
Wrought iron				30,400	19,600	16,400	0.64	0.54
Nickel wrought iron				42,600	25,100	18,600	0.59	0.44
				†39,500				
Nickel iron				39,600	26,900	19,100	0.68	0.48
Nickel molybdenum iron				45,100	25,400	21,900	0.56	0.49

*W indicates water quench. †Values determined for complete reversal of axial stress by Haigh axial testing machine at the Research Laboratories of the Westinghouse Electric & Manufacturing Co.

(From "Economical Selection of Sucker Rods," Blaine B. Westcott and C. Norman Bowers. Petroleum Development and Technology, A.I.M.E., 1935, p. 181)

An instrument is now available[5,6,7] for testing the fatigue of sucker rods. The operation of the instrument is based on the fact that physical characteristics of steel affect the steel's magnetic characteristics. A field test unit consists of a coil through which the sucker rods pass when pulled out or run into the well. The coil is excited with an alternating current, inducing magnetic flux in the rod, which generates an electromotive force in another coil. The voltage of this electromotive force is function of the flux and what follows also the function of the physical characteristics of sucker-rod steel. Both the presence and the magnitude of the fatigue are recorded. A string of sucker rods tested for fatigue in such a manner can be classified from the standpoint of service it is still capable of performing. Good rods can be rerun in the same well, slightly fatigued rods can be used in lighter wells while badly fatigued rods are discarded. Elimination in one run of number of rods which would eventually cause a number of separate breaks resulting in number of separate pulling jobs is a distinct con-

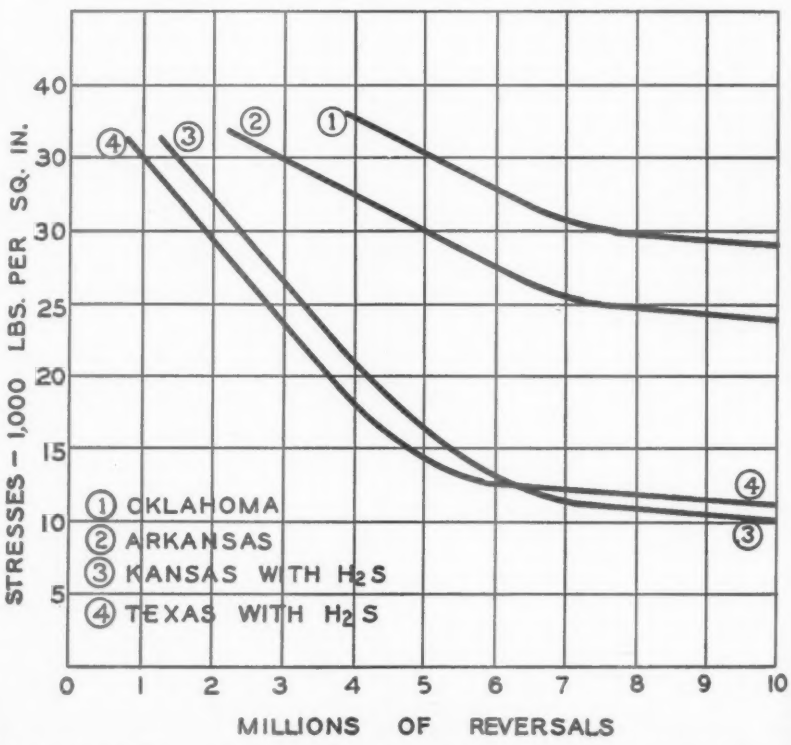


Fig. 3—Results of corrosion fatigue tests for given steel in oil well waters of different areas

TOUGHEST SEAT
in any Small Valve

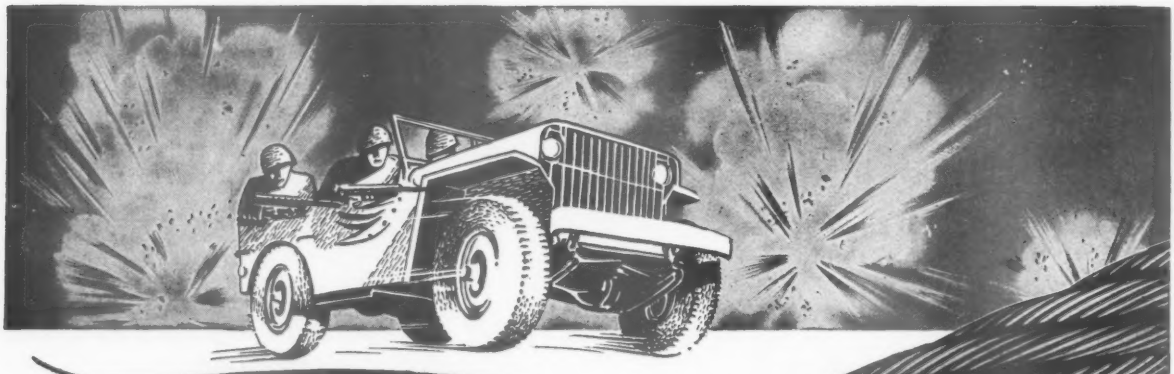
Nothing hurts the seat of this small forged steel gate valve. For Chapman makes the List 960 with tougher seats (and plugs, too) that outlast the corresponding parts of any similar type of valve. And if your service is extra-tough, you can get List 960 with seats and plugs superhardened by an exclusive Chapman process. So you can be sure you won't be continually needled by the usual small-valve repairs, replacements, and all the troubles they cause.

Chapman has also designed List 960 for easy, positive operation . . . with quick-acting threads that won't stick or strip. And the valve can be repacked under full pressure. A full range of sizes, from ½" to 2½", covers all your requirements on small field and refinery lines. Standardize on List 960, and you'll be sitting pretty for the duration.

The CHAPMAN VALVE MFG. CO.
INDIAN ORCHARD, MASS.

CHAPMAN List 960

. . . THE SMALL STEEL GATE VALVE WITH SEATS AND PLUGS THAT STAND ANY SERVICE LONGER



Plenty Tough...

but it still needs Lubrication

Wham! The bouncing jeep refuses to be stopped. And one big reason is: The boys keep it in fighting trim with *regular* lubrication. Give your wire rope the same care and its resistance to destruction will also be something to talk about.

When wire rope leaves the factory it is lubricated clear through. Inside wires bear on each other with minimum friction as they bend around drum or sheave. If it's a hemp center rope, the saturated core feeds more lubricant to wires and strands as loads are applied. The lubricant on outer wires checks dirt and moisture, too.

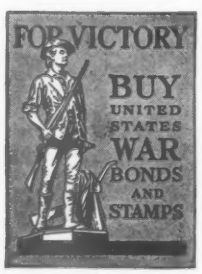
But weather, pressure, heat and corrosion will eventually exhaust the protection unless the lubricant has been *renewed* in time. A dry core or rusted inner wires won't be visible to the eye. So, if it's sound to "grease" jeeps and trucks at stated intervals in order to *prevent* damage, it's sound to do the same for wire rope.

A good lubricant penetrates to the core and still has viscosity to cling to individual wires. Major oil companies make excellent products for this purpose. Get a supply and use it regularly. If you wish detailed lubrication instructions or any other assistance in conserving rope, feel free to call on B & B engineers. Remember . . . Uncle Sam will thank you for making your wire ropes *last longer.*

BRODERICK & BASCOM ROPE CO., ST. LOUIS

Branches: New York, Chicago, Houston, Portland, Seattle
Factories: St. Louis, Seattle, Peoria

YELLOW STRAND
PREFORMED
WIRE ROPE



A MAINSTAY OF WAR PRODUCTION

tribution toward economy of operations.

Since the most common process of sucker-rod body failure is corrosion fatigue[8] and since resistance to corrosion fatigue is dependent primarily on the resistance to corrosion of rod material, the question of selection of this material, for a specified set of conditions, is an important one.

Selection of Material

Prime requirements of sucker-rod material capable of performing satisfactory service are sufficient tensile strength and inherent resistant to corrosion and embrittlement. Other requirements are ductility, uniformity of composition, resistance to stress concentration.[9] Attempt to apply, in manufacture of sucker rod, materials satisfying these requirements can be seen in evolution of the sucker rod, from the standpoint of material used, from wrought iron to soft steels, to steels with higher carbon content and increased manganese and to steels with addition of nickel, molybdenum and chromium. At the same time methods of manufacture were improved, various forms of heat treatment tending to improve the physical properties of rods. As manufactured now, a sucker rod should give economically satisfactory service if used under conditions for which it is designed and if given proper care in normal oil-field operations.

In selection of material both the initial cost and the expected cost of operation have to be considered. It has been suggested[10] that ratio of the corrosion fatigue endurance limit of given rod to the cost of the rod furnishes a good index for the economic suitability of the rod for a given set of conditions. For light wells with no corrosion conditions present, ordinary steel sucker rods will be entirely satisfactory and will give good service. For heavier wells with no corrosion present higher tensile strength rods will be needed. For corrosive or hydrogen embrittlement conditions, alloy steel rods have to be resorted to. How the composition of well fluid affect the endurance limit of rods is shown in chart shown in Fig. 3. This chart, prepared from data collected by Dale and Johnson[11] is the S-N chart for certain type of steel and shows endurance limits which corresponds quite closely to actual known field conditions in given areas. The laboratory tests were performed with speed of 1,700 r.p.m.

Exhaustive tests were performed on different types of sucker-rod materials by Westcott and Bowers[12] to determine their air, corrosion and sulfide corrosion endurance limits. Results of these tests are shown in Table 1.

Bibliography

1. T. P. Sanders: "Distortion of Sucker Rods Should Be Avoided When Pulling Stuck Pumps," The Oil and Gas Journal, Sept. 12, 1940.

2. D. R. Dale: "Surface Cracks in Sucker-Rod Couplings — Researching for the Cause," Oil Weekly, Aug. 14, 1939.

3. "Sucker-Rod Costs Determined From Operating Data," The Oil and Gas Journal, Cost Engineering, Apr. 9, 1942, p. 49.

4. Emory Kemler: "The Economic Life of Sucker Rods," Drilling and Production Practice, A.P.I., 1936, p. 226.

5. H. M. Henderson: "Recently Developed Methods for the Inspection of Tubular Goods and Sucker Rods." A paper presented before the Pacific Coast district, A.P.I. Division of Production, Mar. 11, 1941.

6. "Magnetic Fatigue Test for Sucker Rods," Petroleum World, Dec. 1940.

7. Wallace A. Sawdon: "Determining Fatigue in Sucker Rods," Petroleum Engineer, Feb. 1942.

8. C. G. Zur Horst and Blaine B. Westcott: "Sucker Rods—Why They Break," Petroleum Engineer, Nov. 1931.

9. F. B. Bayless: "Nickel Alloys Resist Sucker-Rod Fatigue and Corrosion," Nickel Steel Topics. See also Petroleum Engineer, Sept. 1936, p. 160.

10. Emory N. Kemler: "Sucker Rods—Some Problems Involved in Their Application," International Oil. Jan. 1941, p. 50.

11. D. R. Dale and D. O. Johnson: "Laboratory and Field Endurance Values of Sucker-Rod Materials," Drilling and Production Practice, Am. Pet. Inst. 1940, p. 209.

12. Blaine B. Westcott and C. Norman Bowers: "Economical Selection of Sucker Rods," Petroleum Development and Technology A.I.M.E., 1935, p. 177.

Conventional Refining Of Sour Crudes

(Continued from Page 35)

gether in a mixture. This is illustrated by the data tabulated in Table 4.

The strength of the acid to be used in treating gasoline for sulfur reduction will depend upon the procedure adopted and the amount of reduction required. In general, it can be said that the stronger the acid the more effective in sulfur removal and that, if it is not necessary to treat both cracked and straightrun components, it is more economical to remove the sulfur from the straightrun. The latter is true because there is very little if any polymerization loss and less solution loss in treating the straightrun, and because the latter does not require subsequent rerunning.

In acid treating straightrun, 98 per cent sulfuric acid is probably used most commonly, but tests have shown that fuming acid is more economical. The relative effectiveness is shown by the curves in Fig. 4.

In treating cracked naphthas, the stronger acids are likewise more effective in sulfur reduction, but this advantage is more than offset by the increase in losses due to polymerization. Since below 90 per cent the effect on sulfur drops rapidly with the strength of the acid, the most common concentration used when treating cracked naphtha with fresh acid is 66° B. — 92-94 per cent. It has been our experience, however, that treatment with sludge from straightrun treating is even more desirable when both components are being treated, and it has been shown also that spent acid from the sulfuric acid alkylation process is entirely satisfactory. The relative effectiveness of this acid, compared to 98 per cent sulfuric acid, in sulfur reduction on a sample of straightrun gasoline is shown by the curves in Fig. 5.

Although not in use at this refinery, mention is made of cold acid treating. When the treating temperature is lowered, the polymerization and solutions losses which accompany the treatment of a cracked gasoline with acid are materially reduced, but there is very little effect on the sulfur reduction. Consequently a method has been developed which employs refrigeration to maintain a low temperature during acid treatment.

This method is particularly advantageous on very high sulfur stocks which require heavy acid treatment. The justification for installing and using such equipment is dependent, however, on the particular conditions involved and requires careful evaluation in each case. With proper equipment for caustic scrubbing and regeneration, from 50 per cent to 80 per cent of the mercaptan sulfur can be removed from cracked gasolines and from 20 per cent to 50 per cent from straightruns.

Sweetening

As previously stated, this plant uses doctor solution and sulfur for sweetening. This has been found to be entirely satisfactory.

Whatever sweetening process is to be used on gasolines from high sulfur crudes it must be realized that the mercaptan content may be as much as 10 or 15 times as high as in those from sweet crudes, and the facilities must be greater in proportion. In changing from low sulfur to high sulfur stocks, the increase in sweetening equipment required can be roughly calculated from the ratio of the mercaptan of the two stocks.

Swedish Shale-Oil Output To Be More Than Doubled

A bill has been introduced into the Swedish Riksdag for the purpose of stepping up the production of shale oil from 37,000 to 82,000 tons, annually. This is inadequate to supply Swedish demand and the project will not show much increase before 1944, but it is considered an important step in assuring at least partial self-sufficiency.

The bill proposes the merging of the shale-oil works at Kinnekulle and Kvarntorp in the central and southwestern parts of Sweden and erection of a large plant at Kvarntorp. The shale will be electrically heated giving off oil-bearing gas which will then be condensed. Estimated cost of the project is $6,500,000.

PROGRESS IN METALS

by W. L. Nelson

Corrosion of Bearing Alloys By Lubricating Oils

Abstract: L. M. Tichvinsky, S.A.E. Journal, Vol. 51, March 1943, Transactions, pp. 69-77. Taken from Metals & Alloys, June 1943.

The Underwood oxidation apparatus was used for the investigation of the corrosion of bearing alloys by lubricating oils. Bearing shells were accurately weighed before test and after each 10-hour test interval. Analyses of lubricating oils were made at 10-hour intervals. Most tests were run for 40 hours at 325° F., but several 20-hour tests were also made at 350° and 375° F.

The bearing alloys investigated were (1) tin-base babbitt, (2) lead-base babbitt, (3) alkali-hardened lead babbitt, (4) arsenic lead-base babbitt, (5) silver lead-base babbitt, (6) cadmium-silver alloy, (7) cadmium-nickel alloy, and (8) copper-lead alloy.

Composition of the alloys and of the oils are tabulated and the results of the tests are presented on graphs. The structures of Nos. 4 and 5 alloys were essentially similar to those of commercial lead-base babbitts.

The approximate thermal conductivity of the bearing alloys in per cent of the thermal conductivity of pure copper is (1) 9, (2) 6, (3) 5, (4) 5, (5) 5, (6) 21, (7) 21, and (8) 30 per cent. The straight mineral and the additive-type lubricating oils used possessed various characteristics. S.A.E. 30 grades were used. Some tests were made with re-refined oils.

Corrosion Data

Corrosion of the copper-lead bearings was mainly uniform, while that of the white bearing alloys was mostly localized. The accelerated corrosion test results indicate that the corrosion of the tin-base bearing alloy was negligible with all lubricating oils tested, even at 350° and 374° F.

Corrosion of the lead-base bearing alloys was low and moderate. The least corrosive in this group were the arsenic and silver lead-base babbitts. The corrosion of alkali-hardened lead was low with one oil and excessive with another oil.

Corrosion of the cadmium-base alloys was high. Excessive corrosion of cadmium-nickel occurred within the first 10 hours at 325° F., and in the case of cadmium-silver within 20 hours with the oil that caused high corrosion of the alkali-hardened lead. Copper-lead bearings also corroded excessively.

An increase in the test temperatures accelerated the oxidation and rate of acid formation of the lubricating oil and the corrosion of the tested bearings. Tests with compounded and re-refined oils indicate that careful selection of additives should be made to reduce the corrosiveness of the uncompounded oil. Some additives can increase corrosiveness.

The bearing alloys which have a tendency to corrode at elevated temperatures should be lubricated with low-corrosive oils. Adequate cooling of the oil is of paramount importance, because it will impede oxidation of the oil and thereby diminish bearing corrosion.

Corrosion information should be included with fatigue strength, heat conductivity, and compression and hardness at elevated temperatures when selecting bearing materials for various heavy-duty applications.

Aluminum After the War

All of use, even we of the petroleum industry, must be ready to utilize the vast productive capacity for producing aluminum that is being built. By the end of this year the capacity for making this metal will be many times the capacity before the war, almost 1,050,000 net tons per year. The price has already decreased by 25 per cent since 1939 and further decreases may, according to the basic price policy of Alcoa, be expected. Our aircraft workers constitute a large group of workmen who are familiar with the fabrication of aluminum—with the "know how" of its properties. The Aluminum Co. of America offers the following interesting estimate of the users of aluminum before, during, and after the war:

Market—	Nov. 1939 per cent	Dec. 1940 per cent	May 1942 per cent	After World War II, per cent
Transportation (land, air and water)	29	10	63	34
Cooking utensils	14	6	1	10
Electrical conductors	10	5	0	8
Machinery and electrical appliances	15	9	6	12
Building construction	8	5	3	9
Chemical	5	5	5	5
Foundry and metal working	4	23	19	9
Ferrous and nonferrous metallurgy	5	4	2	4
Food and beverage	6	2	0	5
General miscellaneous	5	1	1	4

Bibliography of Indium

References to published information on the metal indium is now available in "A Bibliography of Indium, 1941-1942 Supplement" by Maria Thompson Ludwick, the Indium Corp. of America, 60 East Forty-second Street, New York. This listing shows over 150 articles or references to indium during 1941 and 1942, under such headings as "Occurrence and Extraction," "Physical Properties (Optical, Electrical, Misc.)," "Analysis Methods," "Alloys," "Chem. Properties," and "Misc. Information (Uses, Costs, Production, etc)." These references may assist manufacturers in applying indium as a corrosion resistance agent, with silver-lead bearings, for reflector surfaces, low-melting alloys, and as a plating metal along with lead or silver.

Indium is still in Group 2 of the Material Substitution and Supply list (April 15, 1943—see this page May 13, 1943) which permits its use for both war and civilian purposes, although it is becoming somewhat more scarce, possibly due to a wider application. Some information on indium was given on this page of May 15, 1941.

Metallurgical Terms

Reference to Metallurgical Terms or Definitions

The terms or definitions found on these pages have been taken to a large extent, from:

1. A.P.I. Code No. 28—"Code of Metallurgical Terms and Ferrous Alloys," Am. Pet. Inst., 50 West 50th St., New York, price 25 cents.

2. A.S.M.—A somewhat similar set of definitions published in the Handbook of the Am. Soc. of Metals.

3. General data book, Joseph T. Ryerson & Son, Inc.

Engineering Fundamentals No. 99

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

POROSITY OF OIL-BEARING ROCKS

ONE of the primary points of interest concerning an oil-bearing stratum is the amount of space available to contain the oil and gas. In order to determine the amount of such space, it is necessary that one know the porosity of the reservoir rock.

Absolute porosity is the ratio of the total volume of pore space in a rock to the total bulk volume of the rock, commonly expressed as a percentage. Stated in another way, absolutely porosity represents the quotient that would be obtained by dividing the total bulk volume of the rock by the difference between the total bulk volume and the volume of solid material making up the rock.

The pores of a rock are very irregular in shape and size, and are rarely all continuously connected throughout the rock. Since some of the pores are sealed, they do not allow drainage of fluids from them. So it is the interconnected pore space that is of chief concern in petroleum production problems. The ratio of the volume of interconnected pore space to the total bulk volume of the rock, expressed as a percentage, is termed the **effective porosity.**

The porosity of a rock may vary from almost zero to as high as 60 per cent, with most oil-bearing rocks having porosities between 10 and 40 per cent. The average porosity of commercial oil sands is probably slightly below 20 per cent.

The porosity of a sand is not influenced directly by the actual grain size of the sand. More particularly, it is influenced by the grain size distribution, the shape of the sand grains, and the amount of cementing material present between the grains. It can be shown both experimentally and mathematically that if a sand were composed of perfectly spherical grains, all of uniform size, packed together as closely as possible, the porosity of the pack would be 25.95 per cent. This would be true regardless of the actual grain diameters. However, if the grain size was not uniform, the smaller grains would tend to fill the space between the larger grains and, still assuming perfect spheres, the porosity of the sand when packed as closely as possible would be less than 25.95 per cent. Thus, based on this ideal condition of perfect spheres, we can say that nonuniformity in grain size tends to reduce the porosity of the sand. Since the actual sand usually is composed of grains of very irregular shape, the porosity of actual sands may be either higher than 25.95 per cent or lower than 25.95 per cent depending upon the manner in which the grains fit together.

In many sands, particularly unconsolidated sands, the effective porosity will be no lower than the absolute porosity. The presence of certain mineral cementing matter between the sand grains, however, may seal off a large portion of the pore space and reduce the effective porosity to a value considerably lower than the absolute porosity. In many fields the effective porosity of the sand is so slightly less than the absolute porosity of the sand that absolute porosity methods are used for determining the percentage porosity to use in calculations and other considerations.

Generally speaking, an oil sand may show great variations in porosity vertically (across the bedding planes), but does not show very great variations in porosity parallel to the bedding planes. This is due to the fact that the sand along any one bedding plane was laid down at a given geologic time and all of the sand along the plane over a wide lateral extent was deposited under similar sedimentation conditions. However, a change in sedimentation conditions may have occurred before the next foot of sand was laid above that plane; thus, the next foot of sand may be somewhat different in so far as its porosity is concerned. It is not meant to infer that such a change in porosity will always occur at very close intervals, as, for example, every foot of thickness. In certain sands it may be observed that the porosity is uniform over 5-ft., 10-ft. or even greater intervals.

The practice commonly followed in taking samples for porosity tests consists of obtaining a core sample for porosity determination in each vertical interval of sand thickness that shows a different porosity to adjacent vertical intervals. This may require, in some sands, the taking of samples from each foot of core; in other sands, a sample taken every 2 ft. may be sufficiently close. Rarely would it be advisable for the samples to be taken farther apart than 5 ft. vertically if one wishes to obtain an accurate weighted porosity for a given sand. One may be inclined to think that a porosity sample obtained from the small space occupied by the core is not representative of the sand affected by the drainage of the well under consideration. However, the fact expressed above concerning the small variation of sand characteristics along bedding planes makes it logical to assume that each sample taken from a well at a given level gives results that are representative, within practical limits, of that level throughout the oil reservoir.

The weighted average porosity of a section of sand may be calculated by multiplying the porosity figure for each vertical interval by the thickness of such interval, adding up these products, and dividing the total by the total thickness of the section. This is illustrated by the following example:

Example

Problem.—Given the following porosity data from a well:

Sample No.	Depth of sample, ft.	Porosity, per cent
1	4,548	25.5
2	4,550	21.0
3	4,552	18.0
4	4,554	12.0
5	4,556	17.0
6	4,559	20.7

Top of sand: 4,547 ft.
Bottom of sand: 4,560 ft.

Calculate the weighted average porosity of the given sand.

Solution. — It is logical to assume that the porosity of the sand above the top sample is the same as that of the top sample, and that the porosity below the bottom sample is the same as that of the bottom sample. It is also logical to assume that the porosity change occurs midway between any two adjacent samples. Any error caused by these assumptions can be reduced by taking samples closer together.

The following tabulation shows the calculation of weighted average porosity:

Extent of sand interval (ft.)	A Thickness (ft.)	B Porosity, per cent	A × B
4,547-4,549	2	25.5	51.0
4,549-4,551	2	21.0	42.0
4,551-4,553	2	18.0	36.0
4,553-4,555	2	12.0	24.0
4,555-4,557.5	2.5	17.0	42.5
4,557.5-5-4,560	2.5	20.7	51.8
	13.0		247.3

$$\text{Weighted average porosity} = \frac{247.3}{13} = 19$$

per cent.

Series prepared by Glenn M. Stearns, associate professor of petroleum engineering, University of Oklahoma

Official U. S. Army and Navy Photos

GARLOCK AT WAR . . .

97.93% of all products now being manufactured by Garlock go to war. More than half of that production enters into implements of war—and the remainder represents materials used in the maintenance of war plants. THE GARLOCK PACKING COMPANY, PALMYRA, NEW YORK.

FOR **DAYTIME** EFFICIENCY

JUSTRITE
Twin-Bulb
Inspector's Lantern

Turns night into day around rigs, pipe-lines, loading points, etc. . . . makes it easier and surer to keep production moving. Lantern is easily carried by fixed "spade grip" handle or set on movable stand for steady, focused beam. Justrite ruggedness and "twin-bulb" feature guarantee years of dependable, trouble-proof operation.

Inspector's Lantern (46-W) highly polished 7" reflector or globe can be removed independently. Twin-bulbs guard against light failure. Powerful 1500 foot beam.

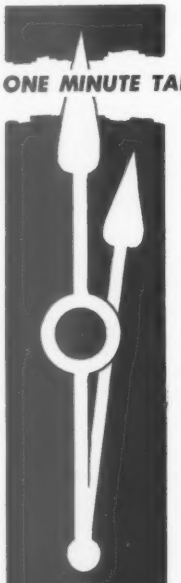
See your jobber, or write today for details and prices.

JUSTRITE MANUFACTURING COMPANY
2061 N. Southport Ave., Chicago, Ill.

JUSTRITE *Safety Products*

SAFETY CANS · FILLING CANS · OILY WASTE CANS
APPROVED SAFETY ELECTRIC LANTERNS

ONE MINUTE TALKS ON



Cleaning Shell and Tube Heat Exchangers Quickly!

Efficient maintenance practice calls for periodic cleaning of shell-and-tube type heat transfer apparatus. Here is another important job where Oakite materials enable you to shorten shut-down time and conserve manpower.

For removing sludge and carbonized oil deposits without dismantling units, simply circulate solution of recommended heavy-duty Oakite material as directed. Where water is the cooling medium, get rid of limescale and rust deposits with Oakite Compound No. 32. Our nearby Technical Service Representative stands ready to help you solve these problems. Write today to have him call!

OAKITE PRODUCTS, INC.
44C Thames St., New York 6, N. Y.
Technical Service Representatives Located in All Principal Cities of the United States and Canada

OAKITE *Specialized* **CLEANING**
MATERIALS & METHODS FOR EVERY CLEANING REQUIREMENT

SAVINGS BY BELT SERVICE RECORDS

FREQUENT replacement of flat belts on pumping equipment is considered by many operators to be a necessary evil. However, an analysis of belt records and operating conditions often shows that premature belt failures can be avoided.

Only two things can cause premature belt failures—unfavorable operating conditions or defective material and workmanship in the belt. While defective belts occasionally are found, it is fairly safe to conclude that the large number of belt claims filed with manufacturers each year do not reflect poor workmanship so much as they do bad operation on the part of the producer.

Belts used on pumping wells are often subjected to momentary peak loads which greatly exceed the rated capacity of the belt. Since belt drives are usually designed on the basis of average horsepower requirements, it is essential that these momentary peak loads be reduced to a minimum. If this is not done, early belt failures often result. Excessive peak loads, which are placed on the belt, in almost every instance can be traced to lack of proper counterbalance.

While this is strictly a field problem, adequate belt records are invaluable as a check on well operating conditions.

Analysis of Belt Records

A summary compiled from individual belt service records is shown in Table 1. A casual inspection of these records, covering three different brands of belts, might indicate that Brand "C" gave considerably less service than the other two. That this is not true, is shown when the belt service is computed on the basis of average horsepower transmission and maximum well load.

For all practical purposes the average horsepower transmitted by the belt can be obtained either by multiplying the hydraulic horsepower by two, or by taking the rated capacity of the prime mover at the operating speed.

Examination of the belt service on the basis of average horsepower transmission, shows some inconsistencies but, in general, the belts transmitting the greater horsepower gave the shortest service. While this might be due to improper belt design or selection of the wrong belt size, it is probably due to the fact that excessive peak loads are usually encountered on the wells with the greater horsepower requirements.

TABLE 1

A. Comparison of Average Service Given by Three Brands of Belts

	No. belts investigated	Average belt service—Mo.
Brand "A"	53	18.2 mo.
Brand "B"	74	19.1
Brand "C"	17	13.3

B. Average Belt Service on the Basis of Average Horsepower Transmission

	Below 25 hp.	24-40 hp.	Above 40 hp.
Brand "A"	19.3 mo.	17.3 mo.	9.1 mo.
Brand "B"	23.4	8.2	21.3
Brand "C"	21.2	10.6	13.7

C. Average Belt Service on Basis of Maximum Well Load

	Below 13,000 lb.	13-17,000 lb.	Above 17,000 lb.
Brand "A"	38 mo.	20.8 mo.	5.8 mo.
Brand "B"	44	16.2	9.4
Brand "C"	32	25.6	6.2

The summary showing belt service on the basis of maximum well load is still more enlightening. Without exception, the well with lighter loads gave the best belt service. If effectively counterbalanced, the maximum well load should have no effect either on the horsepower transmitted or the stresses on the belt. The poor belt service obtained at the heavier wells is an indication that either some or all of the wells in this class are not effectively counterbalanced. The individual belt service records (not shown in Table 1) should be examined and all wells giving less than average belt service should be listed.

Check on Well Operating Conditions

This list should be called to the attention of the field personnel or engineers involved. A check should then be made on these wells to determine if operating conditions can be improved. The counterbalance can be checked by various methods. Some operators "slip" the clutch to determine if the well is properly counterbalanced. If the well is overbalanced the crank slips on the upstroke, if underbalanced on the downstroke.

Perhaps the most accurate method which can be used is to take charts with a recording tachometer at the engine crankshaft. These charts show two peaks for each well cycle. If the well load is not properly counterbalanced one of these peaks will be considerable higher than the other. A chart from a well which is not properly counterbalanced is shown in Fig. 1. Fig. 2 is a chart showing that the well load is effectively counterbalanced.

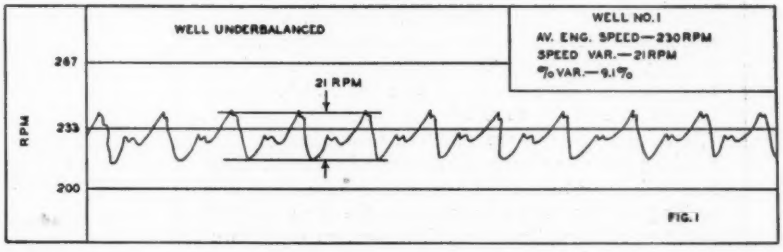


FIG. 1

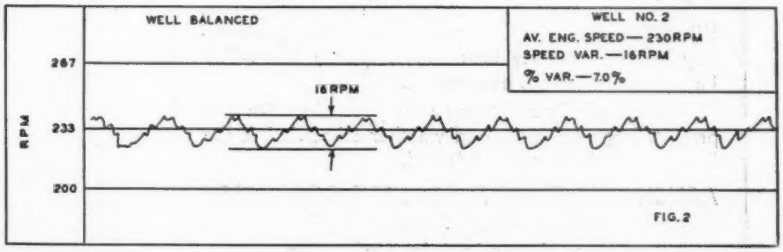


FIG. 2

DOING A STAND-OUT JOB

of Liquid Level Control for the War-Pressed Petroleum Industry

● The applications listed here are only a few of the many to which the petroleum industry has put just *one model* of MAGNETROL Liquid Level Controls. Judge from that the many possible uses that exist in your operations—refineries, tank batteries, synthetic rubber production, etc.

You can trace the choice of MAGNETROL Liquid Level Controls back to one basic reason: *supreme dependability*, the result of an operating principle so simple and reliable that maintenance and repair problems are next to unknown. Trouble-making bellows, packing, diaphragms, electrodes are completely eliminated in these modern controls.

Let a Schaub engineer go over your liquid level control problems and recommend the right MAGNETROLS to handle them. Write today.

MAGNETROL, INC.
327 W. Huron Street • Chicago, Illinois
A Division of Fred H. Schaub Engineering Co.

No. 750-EP MAGNETROL
Completely welded control unit with explosion-proof head for oil and gas piping and hazardous locations. Max. 750 lbs., max. temp. 750° F. One or two level stage control. Operating differential, 3/4" to 3".

- ☐ H. S. Compressor Knock Out Drum High Level Alarm
- ☐ High Level Alarm and Engine Shut-Off Second Stage Recompressor Suction
- ☐ High Level Alarm and Engine Shut-Off Third Stage Recompressor Suction
- ☐ High Level Alarm and Engine Shut-Off H. P. Reabsorber Residue Scrubber
- ☐ High Level Alarm and Engine Shut-Off on L. P. Reabsorber Residue Scrubber
- ☐ High Level Alarm and Engine Shut-Off on Propane Compressor or Inlet Scrubber
- ☐ L. L. Alarm on De-ethanizer Reflux Accumulator
- ☐ Level Alarm Butadiene Compressor Suction Trap
- ☐ Level Alarm Recycle Compressor Suction Trap
- ☐ Compressor Cut-Off for Butadiene Compressor
- ☐ Gravity Compressor Cut-Off for Recycle Compressor

Write Today for Complete Information on MAGNETROL LIQUID LEVEL CONTROLS

25,000 TONS OF METAL SAVED

on only 4 jobs!

On only four tailor-made large-diameter pipe jobs, more than 25,000 tons less iron were used than would have been necessary under other methods of design and manufacture of cast iron pipe. This saving resulted from specifying Mono-Cast Centrifugal Pipe in 16-ft. lengths, made in accordance with the A.S.A. Law of Design. In addition to this important saving in metal, 7,256 fewer joints were required with 16-ft. lengths, resulting in a large saving of labor and material. Three hundred fewer tons of joint materials were needed in making up the joints. Because of the high physical qualities of Mono-Cast Pipe, there was no sacrifice of strength or safety.

Such savings are important in both war and peace. When "plangineering" for peace time projects, or actually building for war time needs, specify Mono-Cast Pipe—strong, lasting, economical.

We will gladly assist you with your plans for any project, large or small, and whether scheduled in the immediate future or at war's end.

AMERICAN CAST IRON PIPE COMPANY
BIRMINGHAM 2, ALABAMA
Sales Offices in Principal Cities

A TOUGH CREW? *You said it!*

● Who knows better than you, Mr. Field Man, just how *much* trouble that gang can cost your production! And who knows better than men who use them, how much time and expense can *actually be saved* with . . .

DARCOVA VALVE CUPS . . . *At Your Supply Store*

For over thirty-five years, DARCOVA—the original composition valve cup—has faithfully and economically served oil production, at *all* depths, under the severest service conditions. Precision manufactured in a variety of textures and sizes, DARCOVA VALVE CUPS will give you *longer, safer, better* service.

***Take Advantage of the* FREE DARCOVA SURVEY SERVICE**

Let a Darcova engineer demonstrate his 3-Point Lower Lifting Cost Program to you. There is no obligation. Phone, wire or write—or ask any supply store. Darcova offers a complete line of Pumcups, Pistons, Valve Cups, Balls and Seats, Seating Cups, Seating Rings for oil well and reciprocating pumps.

DARLING VALVE & MANUFACTURING CO.
WILLIAMSPORT, PENNA.

Journalog

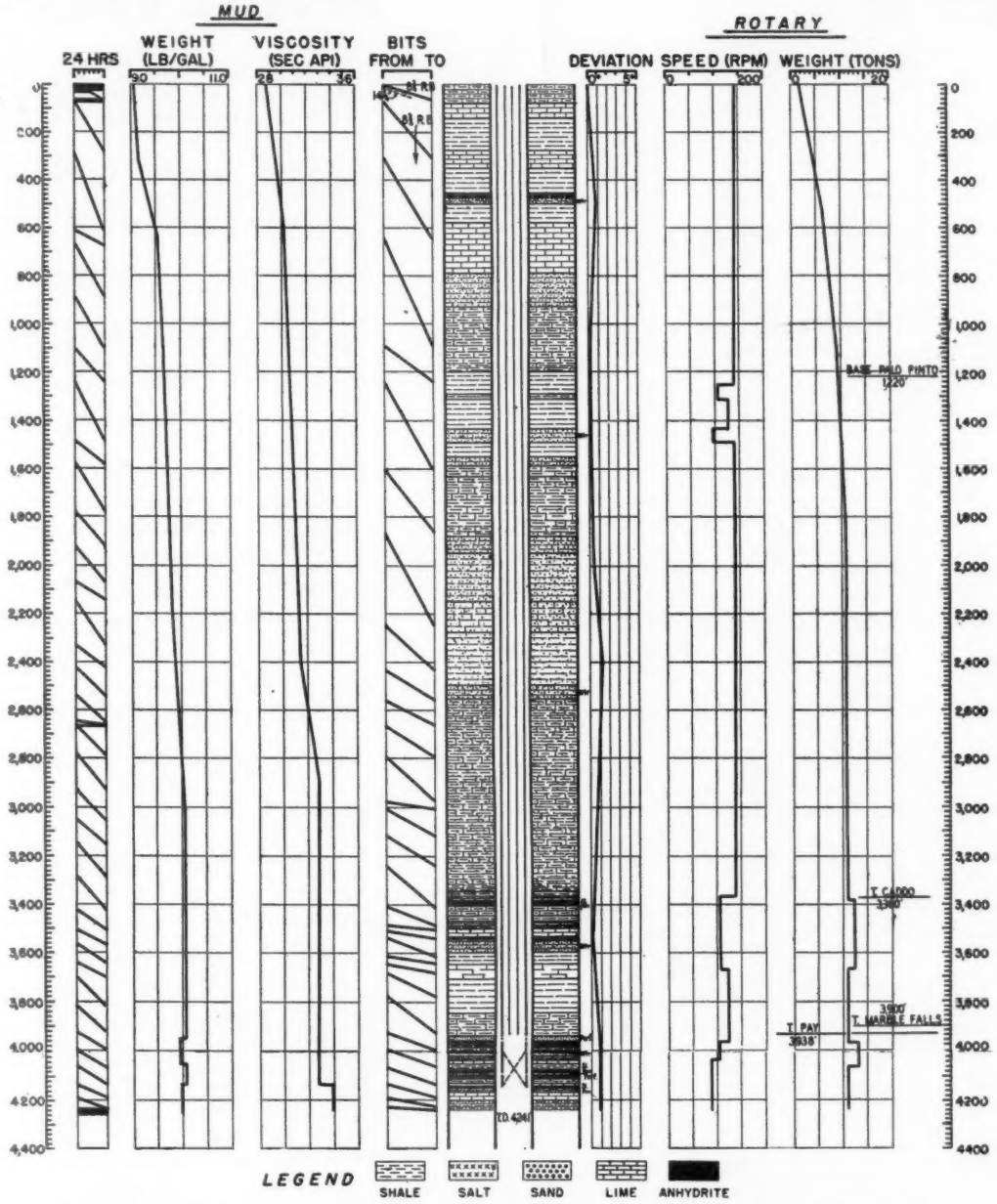
Discovery Well of Corbett Ranch Pool, West Central Texas

BEN F. READ, TRUSTEE, 1 CORBETT

660 ft. S and 660 ft. E of NW cor. of T.E.&L. Co. Sur., Blk. 1092, Stephens County, Texas

CONTRACTOR

TAUBERT & McKEE
FORT WORTH, TEX.



DRILLING DATA

	Days
Total time	63
Days rigging up	4
Waiting on cement (surface)	2
Trips	3.75
Fishing	.75
Circulating and electric logging	.50
Water and gas	8
Replacing draw works	2
Running pipe	1
Drilling	25
Waiting on cement (pay-string)	3
Completing	12
Waiting	7
Swabbing, perforating and acidizing at 4,082-98 ft.	4
Plugging back	1
Drilling out and perforating	2
Running tubing at 3,950-59 and 3,963-72 ft.	1
Tearing down	2

Drilled with steam rotary and 4½-in. drill pipe.

CASING AND TUBING

Size (in.)	Ft.-In.	Cement (sacks)
10¾	36-11	35
5½	4,123	500
2	3,935	...

Mud: Aquagel, 40 sacks
Acid: 1,000 gal., 4,082-98 ft.
Cement: Plugging back 4,003 ft., 60 sacks.

Electric log to 4,236 ft.
Elevation: 1,196 ft. DF.
Production formation: Marble Falls lime, 3,938-72 ft.

PRODUCTION TEST—5 Hours

Choke	Open 2-in. tubing
Casing pressure	400 lb./sq. in.
Tubing pressure	200 lb./sq. in.
Oil production	175 bbl.
Gravity	43.8° A.P.I.
Gas/oil	290/1

BITS USED

No.	Size	Type
1	14¼	Rock bit rerun
31	6¾	Rock bit

New, Patented* PLANT PRECISION MOLDED process

ACHIEVES UNPRECEDENTED LIGHT WEIGHT

in 85% MAGNESIA HEAT INSULATING MATERIAL!

So light that anyone can lift it—and so revolutionary that it re-writes all present-day standards of heat-insulation efficiency! Here for the first time is a new, amazing, patented process that capitalizes upon the time-tested insulation values of 85% Magnesia, bringing unprecedented advantages — not only in lightness, but also in lower thermal conductivity; controlled uniformity; greater "ductile strength"; durability, precision pipe fit, and other long-wanted factors. Detailed descriptive material sent upon your request.

ELIMINATES 5.8 LBS. OF DEAD WEIGHT PER CUBIC FOOT

Weighs just 11 lbs. per cubic foot instead of the usual 16.8 lbs. per cubic foot.

Materially reduces equipment weight—a factor of prime importance on naval and cargo ships!

GOES ON FASTER!

Even the larger, thicker sizes are easier to handle and apply—no matter how cramped the installation may be!

*U. S. Patent Nos. 2,131,374, 2,209,752, 2,209,753, 2,209,754

INSULATION EFFICIENCY approximately **29% BETTER**

than any comparative thickness of heat insulating material weighing 16.8 lbs. per cubic foot, as proved by impartial tests over a full range of temperatures!

Buy U. S. WAR BONDS

PLANT RUBBER & ASBESTOS WORKS

Manufacturers of Plant Insulating Materials and Mechanical Packings Since 1920

MAIN OFFICE: SAN FRANCISCO

Sales Offices in Los Angeles, Wilmington, and Oakland, Calif.; distributors in principal cities.

Factories in Emeryville, San Francisco, and Redwood City, Calif.

Natural Gas

Oklahoma Natural Taps Lula Area

Oklahoma Natural Gas Co. has started work on a 35-mile 12-in. natural-gas pipe line from its trunk-line terminal near Holdenville, Okla., to the new Lula gas area, north of Centrahoma in Coal County, Oklahoma, it was announced last week. The line will cost about $500,000 and will be completed before the advent of cold weather. The Lula area was opened by the Stanolind Oil & Gas Co. et al 1 Cushing Royalty, in NW NE SE 22-3n-9e, for an estimated 44,000,000 cu. ft. of gas a day in the Cromwell sand.

The new line will connect with Oklahoma Natural's 16-in. line at a point 6 miles north of Holdenville. Pressure in the line will range from 700 to 800 lb.

In addition to the cost of the new line, the gas company will spend this summer approximately another $1,500,000 for repairs and improvements on existing lines as an additional assurance of an adequate gas supply.

Projected main-line construction totals 52 miles which, in addition to the Lula 12-in. outlet includes a 17-mile 16-in. line between Bristow and Sapulpa, Okla.

Operators Protest Cayuga And Long Lake Gas Order

AUSTIN, Tex.—A proposed order reducing output of gas wells in the Cayuga and Long Lake fields to a basis equivalent to production of oil wells in the same areas was contested here last week. The proposed order would permit Cayuga's 37 gas wells to produce 182,500 cu. ft. daily. The Cayuga computation is based on 500 cu. ft. of gas in solution being equivalent to 1 bbl. of oil and the Long Lake formula uses 750 cu. ft. of gas as the equivalent of a barrel of crude.

Testimony was offered that Cayuga gas wells have been producing approximately 10 times the amount which would be permitted under the proposed formula and Long Lake about 16 times as much as the order would permit.

The Railroad Commission has been seeking some method of preventing wastage of gas. Jack Baumel, production director for the commission, outlined the gas-allowable order and said it would conserve gas energy in the field reservoir.

Spokesmen for Lone Star Gas Co., the principal purchaser in the fields, for Tide Water Associated Oil Co. and Seaboard Oil Co., and for other operators in the fields said that the proposed formula would not allow a sufficient supply of gas to fulfill requirements even if all low-pressure gas produced from oil wells goes into market channels.

William H. Vaughn of Houston, Tex., engineer for Tide Water and Seaboard companies, said arrangements are being made to gather some of the low-pressure gas formerly popped at oil wells in the fields.

Midwesern Starts Loop For Panhandle Eastern

Laying of 86 miles of 24-in. in the vicinity of Elwood, Ind., for the looping program of Panhandle Eastern Pipe Line Co. is starting this week. The work has been contracted by Midwestern Engineering & Construction Co. This contracting firm has moved equipment from the area near Oakland City, Ind., where it completed more than 30 miles of 20-in. for the War Emergency Pipelines, Inc., products line in the first part of July. Bechtel-Dempsey-Price is laying 241 miles of 24-in. and 26-in. near Sneed, Tex., and Louisburg, Kans., for the Panhandle Eastern program.

Panhandle Eastern Pipe Line Co. has established an office in Room 4205 Field Building, 135 Lake Shore Drive, Chicago, where E. Buddrus, president, and other executive officers will have headquarters. Some personnel and equipment have been moved from New York City following the closing of an executive office there. Present plans call for continuing engineering and operating offices at 1221 Baltimore Ave., Kansas City, Mo.

Michigan Firms Seek Permits for Expansion

Expansion of natural-gas marketing facilities in three Michigan fields awaits approval by the Michigan Public Service Commission.

Consumers Power Co. has asked authority to extend its Saginaw-Flint main line from the McBain terminal in Missaukee County, Michigan, 5 miles into the new North Winterfield pool and to build a 32-mile, 10-in. main line from the new Woodville pool, Newaygo County, Michigan, to Sixlakes on the Lansing pipe-line system.

Mecosta Pipe Line Co. has asked for authority to build 11 miles of 6-in. line from Big Rapids into the new Goodwell pool, Newaygo County.

The three pools represent the first major new gas reserves found in Michigan in 2 years.

Gas Institute Starts Publishing Review

Gas Technology Review is a new publication inaugurated in July by the Institute of Gas Technology dealing with the current literature and all phases of patents, domestic and foreign. The review, starting last month, will be issued quarterly. Subscription rates are $6 annually to nonmembers of the Institute.

Natural Gasoline

Yields of Light Products Increased in Texas

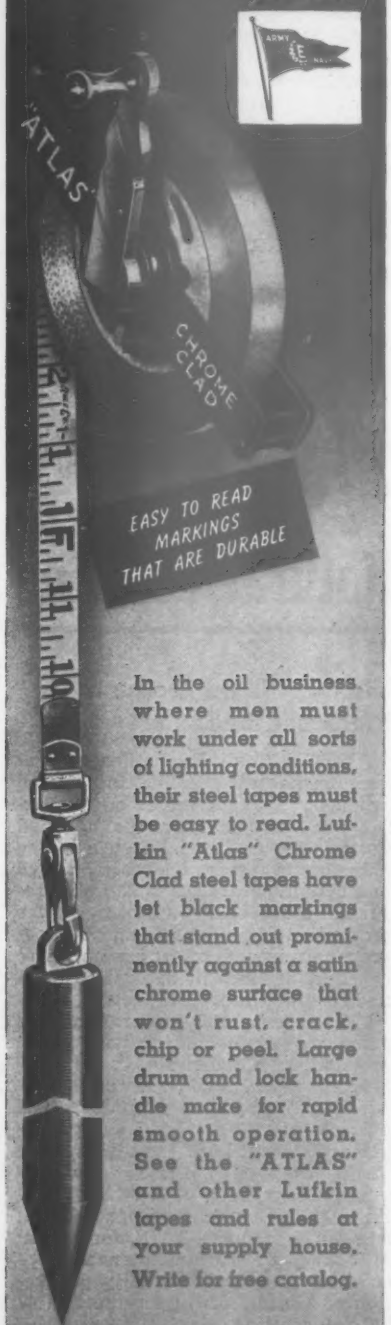
AUSTIN, Tex.—Production of condensate, natural gasoline and related products in Texas increased to 118,261 bbl. daily in May, the Railroad Commission reported last week. The May output averaged 1,992 bbl. above production of 116,269 bbl. daily reported for April. Increases in the production of condensate and butane-propane mixtures offset comparatively slight declines in natural gasoline and so-called other products.

The state's 139 natural-gasoline plants reported the following daily production: Condensate - crude, 127 bbl.; gasoline, 61,211; butane - propane, 12,275, and other products, 697 bbl., for a total of 74,310 bbl. of liquid products. Yields from 28 cycling plants aggregated these daily volumes: Condensate, 13,855 bbl.; gasoline, 12,985; butane-propane, 2,894; and other products, 4,071., for a total of 33,805. Pressure-maintenance operations accounted for daily production of 241 bbl. of condensate and 47 bbl. of gasoline.

SUMMARY OF PRODUCTION
(Figures in barrels daily)

Products—	April	May
Condensate	22,195	24,081
Natural gasoline	74,263	74,243
Butane-propane	14,864	15,169
Other products	4,947	4,768
Total	116,269	118,261

"ATLAS"
CHROME CLAD
STEEL TAPES



In the oil business where men must work under all sorts of lighting conditions, their steel tapes must be easy to read. Lufkin "Atlas" Chrome Clad steel tapes have jet black markings that stand out prominently against a satin chrome surface that won't rust, crack, chip or peel. Large drum and lock handle make for rapid smooth operation. See the "ATLAS" and other Lufkin tapes and rules at your supply house. Write for free catalog.

LUFKIN
SAGINAW, MICHIGAN · New York City
TAPES · RULES · PRECISION TOOLS

REFINING

Maximum Fuel Output Sought at Midwest Plants

WASHINGTON, D. C.—The Petroleum Administration for War this week urged all Midwest (District 2) refiners to increase their output of home-heating oils and to maintain this increased production "until the end of the coming heating season."

Instructions were embraced in telegrams in which PAW established the August crude-oil quotas for Midwest refineries at 1,128,000 bbl. daily, the same rate prevailing in July.

At the same time, 11 refineries adjacent to Great Lakes ports were authorized to increase their runs of crude oil, provided that the petroleum products made from the processing of the additional crude oil are earmarked for shipment to the East Coast.

Explaining the action taken, Deputy Petroleum Administrator for War Ralph K. Davies said:

"Inventories of fuel oil for home-heating use must be increased so that we can be better prepared to meet essential civilian needs in the Midwest and East Coast areas next winter. Stocks of home-heating oils have been building up during the last several months, but now we want to intensify these activities.

"Last year, 75 per cent of the normal fuel-oil requirements were met. This year we expect to do as well; but, we would like to provide even more.

"Besides making more fuel oil from their established quotas on crude-oil runs for August, 11 refineries adjacent to Great Lakes ports have been authorized to run as much crude oil as possible. This action was taken to keep the transportation facilities on the Great Lakes working at their maximum efficient rate."

Increases in the processing of home-heating fuel oils are expected to be made without affecting the production of petroleum war products.

The 11 Great Lakes refineries are authorized to exceed the August crude-run quotas under the following conditions:

1. The refiners will continue to supply crude oil or petroleum products to their usual outlets in the Midwest.

2. The additional crude oil that is run must come from the refiners' own inventory or from another controlled inventory provided it does not interfere with normal supply arrangements.

3. The principal petroleum products obtained from the additional crude runs must be shipped into the East Coast area and cannot be distributed in the Midwest.

Great Lakes refineries authorized to run additional crude are: Sinclair Refining Co., Socony-Vacuum Oil Co., Inc., and Cities Service Oil Co., all in East Chicago; Socony-Vacuum in Trenton, Mich.; Sun Oil Co., Standard Oil Co. of Ohio, and Gulf Oil Corp., all in Toledo; Standard Oil Co. (Indiana), Whiting, Ind.; Naph-Sol Refining Co. in Muskegon, Mich; Bay Refining Co. in Bay City, Mich.; and Standard of Ohio in Cleveland, Ohio.

Gulf Coast Refiners Told to Raise Crude Runs

WASHINGTON, D. C.—All restrictions on refinery runs of crude petroleum by Gulf Coast refiners have been lifted by the Refining Division of the Petroleum Administration for War because of the loss of production owing to storms in that area last week.

Previously PAW had set August refinery quotas in District 3 at the same figures as in July with two exceptions: The Pure Oil Co. refinery at Nederland, Tex., was given a quota of 46,500 bbl. per day as compared with 44,005 bbl. in July, and the Humble refinery at Baytown was given a quota of 173,662 bbl. per day as compared with 163,662 bbl. for July. This

NATIONAL
AIROIL
OIL and GAS
BURNING EQUIPMENT
Serving the Petroleum-Chemical Industry for over 30 Years
For Details, write
NATIONAL AIROIL BURNER COMPANY, INC.
1236 E. Sedgley Avenue
PHILADELPHIA, PENNA.

raised the planned August throughput for District 3 refineries to 1,422,583 bbl. per day compared with 1,410,000 bbl. in July.

In a later telegram to all Gulf Coast refineries, E. D. Cumming, director of refining, said:

"Incomplete reports of yesterday's storm indicate necessity for every Gulf Coast plant able to operate to increase its crude runs to the maximum rate physically possible under present conditions. This to provide products as replacements for those not produced due to shutdowns. Therefore, you are directed to, immediately or so soon as possible, increase your throughput at your refineries regardless of any previous directions relative to total inputs.

"All those refineries which can make 80-octane all-purpose gasoline should maximize such production at the expense of motor gasoline. Instructions regarding various essential products still apply."

Canadian Plant Starts Production of Styrene

SARNIA, Ont.—The first tank car of styrene was shipped the latter part of July by the Dow Chemical Co. of Canada, a unit of the Polymer Corp. synthetic-rubber plant.

The first run of ethyl benzene was cracked on July 1 as the initial operation of the Dow Chemical unit. The product will be used for making rubber in the United States until other units of the Polymer Corp. plant are completed.

Royalite Will Merge Two Turner Valley Plants

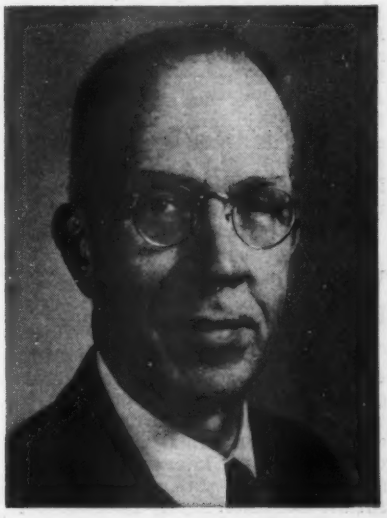
TURNER VALLEY, Alta.—Announcement has been made by the Royalite Oil Co. that the company's two gasoline absorption plants in Turner Valley will be merged into one unit at a cost of around $327,000.

Unification is designed to secure more efficient operation and the production of alkylate to be used in the manufacture of aviation gasoline. Work has been started on the No. 1 plant, and is being handled by the company's engineering personnel.

Sketches of Plant Operators

MERLE M. MOORE, assistant superintendent of the lubricating division of Standard Oil Co. of California's Richmond refinery, has been appointed superintendent of the company's Bakersfield refinery, according to announcement last week by C. E. Finney, Jr., general manager of the company's manufacturing department.

Mr. Moore took his new post August 1. He succeeds C. A. Swigart, who has been functioning as superintendent of the refinery and general superintendent of the central district pipe-line department. Mr. Swigart continues in the latter position.



MERLE M. MOORE

A long-time Standard of California employe, Mr. Moore received his 30-year service pin last March. Born in Kansas, he went to California in 1913, shortly after his graduation from the University of Kansas. His first position with Standard of California was as a chemist in its El Segundo plant. He was in charge of the El Segundo lubricating department for 18 years.

He went to the Richmond refinery in 1931, and has lived in Richmond since then. He and Mrs. Moore have a son, Robert, who is a member of the Coast Artillery, and a 17-year-old daughter, Patricia, who will enter the University of California this fall.

L. B. Barlow succeeds Mr. Moore at the Richmond refinery.

McNAMAR

Steel Plate
Fabricators and Contractors
•
Products storage
•
Pressure vessels

McNAMAR
BOILER & TANK CO.
Tulsa, Okla. — Salem, Ill.

VALVES
PIPE FITTINGS and FLANGES
Cast and Forged STEEL
CAST IRON
Standard and High Pressure

☆

Reconditioned — Guaranteed
to perform like new

For more than 30 years we have been buying and selling used Oil Refinery Plants and Equipment. Large stocks of Pumps, Pressure Vessels, Heat Exchangers and miscellaneous items always carried in stock.

Send us your inquiries!

BROWN-STRAUSS CORP.
1446 Guinotte . . . Kansas City, Mo.

You're "Safe"
WHEN YOU CARRY
90-UL ECOLITE

Don't Wait—Get this new Safety Lantern with BROKEN BULB EJECTOR!

SAFE IN HAZARDOUS PLACES

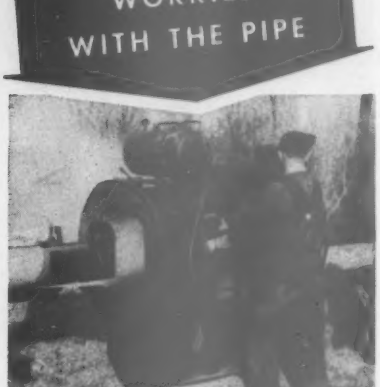
Tested and Recommended by Underwriters' Laboratories.

- Sealed beam construction.
- Throws bright beam 1500 feet.
- Large handle and pivoting feature gives you light where you need it and both hands free for work. Now at jobber and supply stores.

Ecolite No. 90-UL

ECONOMY ELECTRIC LANTERN COMPANY
3100 W. Cherry St. Milwaukee, WIS.

BURY YOUR PIPE CORROSION WORRIES WITH THE PIPE



Here is a simple way to solve pipe corrosion problems—through the complete facilities of Pipe Line Service Corporation. For example, when coating and wrapping lines over the ditch, Pipe Line Service provides traveling type equipment as shown above. These machines, available in three sizes, are mechanically driven along the assembled pipe line and economically apply in one operation a uniform hot coating and wrapper without waste of material. This and other services are available at four strategically located plants which comprise America's most complete pipe protection service.

Write for illustrated catalog

COMPLETE SERVICE
- Coating and Wrapping
  —at the mill
  —at yard or railhead
  —over the ditch
- Pipe Cleaning Service
- Pipe Storage
- Pipe Delivery

PIPE LINE SERVICE CORPORATION
PIONEERS IN STEEL PIPE PROTECTION
General Office—Franklin Park, Illinois
Glenwillard, Pa.—Longview, Tex.—Corpus Christi, Tex.

PIPE LINES

WEP Pushes Laying of 20-In. Products Line

For the 828 miles of the War Emergency Pipelines, Inc., Baytown, Tex.,-Norris City, Ill., section of the Gulf Coast-East Coast 20-in. products system, nearly all of the pipe has been shipped from the mills and more than half of this part of the line has been laid. The main line of the Baytown-Beaumont, Tex., 16-in. line for the project across salt marshes adjoining the Neches River, near Beaumont, is being laid on top of a dredged levee.

RFC is acquiring pump station sites between Beaumont, Tex., and Little Rock, Ark. Special effort is made to complete key stations A, B, F and 7 so as to provide capacity of 115,000 bbl. per day from Beaumont to Norris City during early stages of operating this part of the line after September 1. Of the 805 miles of 20-in. on the eastern leg, more than 150 miles was reported laid last week.

WEP Prepares for Crude Reaching End of 24-In.

As the crude oil filling the 24-in. eastward extension of War Emergency Pipelines, Inc., approaches its destination, which it is due to reach early next week, final work is being done on certain laterals to feed refineries on the Atlantic Coast. To fill the extension nearly 2,600,000 bbl. is required. The entire line from Longview, Tex., to the East Coast will hold about 5,000,000 bbl.

Williams Brothers Corp. had completed the line across the South Schuylkill River at Philadelphia, Pa., before the Phoenixville, Pa., dedication ceremony. In the laying of main river crossings for this project this organization has overcome difficulties of unusually varied terrain.

The line to Linden, N. J., was completed by O. C. Whitaker Co. last week. It is reported that some pipe remains to be laid between Linden and refineries in the New York Harbor area.

At Linden, N. J., WEP has taken over eleven 86,000-bbl. tanks from Standard Oil Co. of New Jersey to be used for insuring a flow to refineries in the area in a satisfactory manner. Four of the fifteen 80,000-bbl. tanks at the Phoenixville, Pa., station are nearing completion.

The original capacity of the 24-in. line from Longview, Tex., to Norris City, Ill., has been restored with the repair of the 24-in. line across the Arkansas River, through which oil is now being pumped. The 20-in. bypass across the Rock Island Railroad bridge will be retained in its present position. Plans do not call for using it under normal conditions. The Gale, Ill., station which was flooded has been back in service for 2 weeks.

On a recent peak day 295,000 bbl. were pumped through the WEP 24-in. line to Norris City.

The first batch of Southwest Texas crude oil of 200,000 bbl. was pumped in the 24-in. line at Longview, Tex. Later batches of 240,000 bbl. of this crude will go through the line in regular 6-day cycles. Batches of 480,-000 bbl. of West Texas crude are shipped on a 6-day cycle.

Wasson-Hobbs Line Leased By Shell From Humble

Shell Pipe Line Corp. has leased from Humble Pipe Line Co. the 33-mile 6-in. looped line from the Wasson pool of West Texas to Hobbs, N. M. About 6,000 bbl. daily will go through the line of which Shell Oil Co., Inc., will receive 5,000 bbl. and Atlantic Refining Co., 1,000 bbl.

For more than 2 years Shell has leased all of the Humble gathering system in the Wasson pool and has been running oil from leased Humble connections for the account of Shell Oil Co., Inc.

Now that allowable has been raised Shell has taken advantage of the op-

SHARMAN and ALLEN
General Contractors
OIL • GAS • GASOLINE
WATER • PIPE LINES
Phone: CHARTER 4-2551
Oil & Gas Building HOUSTON, TEXAS

portunity to lease the Wasson-Hobbs line from Humble which makes it possible to increase capacity of its system by eliminating the bottleneck which otherwise would have existed.

When Shell Pipe Line Corp. reversed its East Texas-Gulf Coast line to feed War Emergency Pipelines, Inc., 24-in. line, Shell leased 6 miles of 8-in. line between Sinco and the Shell refinery at Deer Park, Tex., from Sinclair Refining Co. This serves in delivering West Texas crude shipped through the Texas-New Mexico Pipe Line Co. system to Sinco Junction as well as for delivering Shell's retained share of East Texas production which is brought by Sinclair from the field via Colonels and Huffman to Sinco.

Illinois Decline Affects Eastern Pipe Lines

Crude-oil deliveries through pipe lines in the eastern area of the United States declined moderately in June, and for the first 6 months showed little change compared with a year ago.

The June 1943 deliveries of 28.4 million barrels compared with 29 million in June 1942, and with 29.3 million last May. For the 6 months the eight lines delivered 164 million barrels.

Buckeye was the only line to show a reduction in deliveries for June and for the 6 months, as against similar periods in 1942. The decline, apparently, is the result of production in Illinois where currently, output is averaging slightly in excess of 210,000 bbl. a day, against 275,000 a year ago.

In the accompanying tabulation is shown deliveries of the eight lines for June and for the first six months, with comparisons for similar periods in 1942, in thousands of barrels:

	June		6 months	
	1943	1942	1943	1942
Buckeye	11,932	13,433	68,244	73,660
Eureka	1,093	1,036	6,271	5,719
National Transit	1,903	1,701	10,973	10,089
N. Y. Transit	1,095	1,095	6,544	6,319
Northern	1,710	1,594	10,200	8,724
Ohio Oil	8,341	8,143	48,459	48,408
Southern	947	784	5,268	4,511
Southwest Penn.	1,462	1,253	8,099	7,348
Total	28,483	29,039	164,058	164,778
Dly. ave.	949	968	908	910

ODT Hastens Oil Barges Delivering to Pipe Line

To maintain an unbroken flow of petroleum products to the western terminus of the Sinclair Refining Co.'s pipe line at Steubensville, Ohio, Director Joseph B. Eastman of the Office of Defense Transportation has ordered Inland Waterways Corp. to move a tow of oil barges now in its possession up the Ohio River from Cairo, Ill., part way to Steubenville, it was announced last week.

The corporation ordinarily does not operate barges on the Ohio. The barges it moves up the Mississippi destined for Steubensville are turned over to the Marine Transportation Co. near Cairo, Ill., for movement up the Ohio River.

Sheehan Lays Pipe for East Ohio 120-Mile Line

Construction at the western end of the 120-mile 20-in. Maumee-Brecksville, Ohio, line is being handled by Sheehan Pipe Line Construction Co. Work of this contractor started last month with preparations for laying four 10-in. lines across the Maumee River. A main line gang of Sheehan will work eastward to meet the gang of Holland Construction Co. which is now working near Brecksville, according to reports.

Shell Builds Two Booster Stations in California

Shell Oil Co., Inc., (Pacific Coast division) is building two new stations equipped with electric centrifugal pumps to double the original capacity of the Ventura-Wilmington crude-oil pipe line built in 1941.

C. S. FOREMAN COMPANY

General Contractors

PIPE LINES

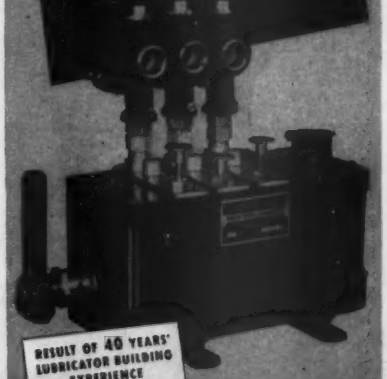
20 West Ninth Street
Kansas City, Missouri

BUCKEYE MAINLINERS
for faster digging of trenches for crude lines. Digs trench 24" to 39" wide — up to 8½' deep.

BUCKEYE TRACTION DITCHER COMPANY
Findlay, Ohio
Built by Buckeye
TRENCHERS, SHOVELS, CRANES
BACKFILLERS, TRACTOR EQUIPMENT

W
WHEATLEY
FOR COMPLETE PIPELINE SUPPLIES
PUMPS
VALVES
EQUALIZERS
HALF SOLES
COLLAR WRAPS
STRAINERS
TRIPODS
TAPPING MACHINES
STERLING CENTRIFUGAL PUMPS
WHEATLEY PUMPS and VALVES

McCORD
Class S.F.
LUBRICATORS
A modern lubricator for modern service on Diesel, gas, steam engines and compressors. Supplies dependable cylinder lubrication in metered quantities reducing friction and wear. Capacities: 2 to 24 pt. and 1 to 16 feeds. New catalog on request.



RESULT OF 40 YEARS' LUBRICATOR BUILDING EXPERIENCE
McCORD RADIATOR & MFG. CO.
DETROIT, MICHIGAN
LUBRICATOR DIVISION

"WHITNEY CHAINS and CONTINENTAL SERVICE

Here's a product-and-service combination that can't be beaten . . . a team that's fully geared up to wartime oilfield needs: You can get the alloy-armored Whitney Chains you need to keep production up and shut-downs down . . . through Continental's service of supply and engineering assistance that gives you what you want, *right when you want it.*

So for full delivery of power *on* the job . . . and prompt delivery of chains *to* the job . . . get Continental to fill all your requirements now, with Whitney Roller Chains.

WHITNEY CHAINS

DISTRIBUTED BY

THE CONTINENTAL SUPPLY CO.

DALLAS, TEXAS

THE WHITNEY CHAIN & MFG. CO. HARTFORD, CONN.

Exploration and Drilling

Week's Highlights

LAST week's record of 348 wells completed in the United States, including 198 new oil wells, lagged behind the previous week's results which showed 232 new producing wells out of a total of 415 completed.

ILLINOIS: A pool was opened in 11-1n-14w, Edwards County, in Levias lime (lower O'Hara), the discovery well flowing 916 bbl. in 24 hours through casing and later over 700 bbl. a day through tubing, and what appears to be another discovery, also in Edwards County, is in 20-2s-14w, the well swabbing 239 bbl. from Aux Vases sand. Two old depleted deep wells tested in higher levels turned out very satisfactorily with better than 400 bbl. a day each in initial production (p. 69).

WESTERN KENTUCKY: Henderson, Union, Daviess and Webster counties are in the course of a development which has not had the consideration that is due it, overshadowed as it is by the larger development of Illinois. The wells produce from much the same sands that are supplying crude to Illinois producers, and the past week's record of completions making 600, 500, 200 and 157 bbl. initial production, or an average of 386 bbl. per well indicate the character of the successful tests in that part of the state. An extensive leasing campaign has been engaged in by major companies and individual operators and there is much absolutely virgin territory in the area which has been placed under lease (p. 76).

INDIANA: The state hit a new low in results in the past week with six dry holes and no new oil or gas wells. Very little active wildcatting is being done in Indiana but one of the week's dry holes was an exploration well in 12-7s-12w, in Posey County (p. 76).

WEST CENTRAL TEXAS: The first rotary-drilled well in the Wimberly pool in Jones County was given a potential of 1,200 bbl. per day based on a 3-hour flow from the Cisco series. The oil has a gravity of 44°. A new pool producing from Caddo lime is reported in Stephens County (p. 72).

NORTH TEXAS: Strawn sand production in the Browning pool in Archer County, was opened in the past week. This pool produces mostly from Ellenburger dolomite. Another Strawn sand discovery was reported in a well of Continental Oil Co. west of Wichita Falls, Wichita County (p. 72).

OHIO: In the ancient southeastern Ohio area a Clinton sand well in the Clayton pool started off at 243 bbl. per day (p. 76).

OKLAHOMA: Pottawatomie County discovery flows 87 bbl. of oil in 13 hours. West Edmond pool of Oklahoma County has six drilling wells and is due for rapid expansion (p. 73).

SOUTH LOUISIANA: Sun Oil Co. and Continental Oil Co. have started a 12,000-ft. test on Estherwood prospect in Acadia Parish, where the companies have a 5,000-acre block (p. 72).

KANSAS: An active week is reported in Kansas, with wildcat wells opening new pools in Ellis, Edwards, Saline and Stafford counties. The Glathart pool discovery in Ellis County, is 6 miles from nearest production (p. 73).

CALIFORNIA: Union Oil Co. has started another test in Fresno County between the East and West Coalinga fields. After abandoning its test in 8-20s-15e, at 6,604 ft. the company moved northeastward to Section 4 for its new location (p. 77).

COMPLETIONS IN ALL FIELDS . . .

(Week ended July 31, 1943)

	Oil	Gas	Dry	Total	Footage	Total comp. to date 1943	1942
N. Y., Penna. W. Va.	51	11	4	66	120,996	1,920	2,027
Ohio	3	5	9	17	37,661	485	604
Indiana	0	0	6	6	8,539	131	190
Kentucky	5	7	5	17	42,506	215	127
Illinois	23	0	18	41	108,697	985	951
Michigan	6	1	10	17	44,415	308	403
Kansas	19	0	16	35	120,687	911	867
Nebraska	0	0	0	0	0	18	23
Missouri-Iowa	0	0	0	0	0	9	9
Oklahoma	11	0	11	22	85,013	640	736
Texas:							
North Central Texas	12	0	8	20	76,556	747	678
West Texas	13	0	0	13	61,414	474	900
Texas Panhandle	2	0	0	2	6,290	100	232
Eastern Texas	1	1	2	4	11,025	153	239
Texas Gulf Coast	4	0	5	9	44,662	249	454
Southwest Texas	6	0	12	18	80,764	511	699
Total Texas	38	1	27	66	280,711	2,234	3,202
North Louisiana	4	1	4	9	28,704	179	273
Louisiana Gulf Coast	6	0	1	7	63,682	211	310
Total Louisiana	10	1	5	16	92,386	390	583
Arkansas	1	1	0	2	12,752	141	90
Mississippi and Southeast	2	0	0	2	9,645	55	30
Montana	2	0	3	5	13,219	115	94
Wyoming	1	1	1	3	7,698	67	55
Colorado, Utah	1	0	1	2	2,580	10	9
New Mexico	2	0	0	2	4,184	121	141
California	23	0	6	29	77,208	726	444
Total United States	198	28	122	348	1,068,897	*9,481	10,585
Total previous week	232	32	151	415			
Week ending Aug. 1, 1942	184	57	124	365			

*Total completions week ended July 17, 8,718; July 24, 9,133, corrected.

ROCKY MOUNTAIN

Tensleep Sand Production Extended Into Montana

DENVER, Colo.—The Tensleep sand productive area was extended over into Montana this week with the completion of Minnelusa Oil Corp. 1 E-T Zimmerman, 3 miles northwest of the same company's discovery well in that horizon in the Elk Basin field last fall. It proved to be as good a well as the discovery, and made an average of 110 bbl. an hour on a 5-hour test. There are now 16 active drilling wells in the field, several of which are in the completion stage. Included in this number is the Yale Oil Corp. 1 Watson, an important outpost on the southwest flank, which has been in the pay several weeks, and is ready for official gaging. It is bottomed at 5,581 ft. with the 6⅝-in. cemented in the break between the upper and lower benches of the sand at 5,487 ft. The pipe was perforated in both the upper and lower benches and through the perforations it flowed 60 bbl. an hour on the unofficial gage, and showed no water. It is located a little more than a mile to the southwest of the discovery and is 1,320 ft. structurally lower based on the top of the Tensleep. Since the discovery is 200 ft. down structure from the top, it indicates that the reservoir is filled to a depth of at least 1,520 ft. Stanolind's 1 Dengler, the outpost drilling well on the north, has been delayed at 5,608 ft. fishing for the drill pipe. It is in the Tensleep and showing saturation, but it cannot at present be estimated what it will do. Plans call for carrying it on down to the Madison. Minnelusa 1 E-T "F" Henderson, the first well east of the discovery to reach the pay, topped the Tensleep at 5,090 ft., and is swabbing in as a producer. Ohio Oil Co. has three wells in the completion stage.

Wildcat at Yellowbanks.—An important wildcat in the Yellowbanks district, Pueblo County, Colorado, has spudded in William J. Cannon et al 1 Wilson, NW NE NW 26-24s-61w, which started in a 12½-in. hole to be drilled with cable tools to around 2,600 ft. The structure is located on the Apishipa uplift, and has been known for a number of years, but has never had a deep test. In 1925, Utah Southern Oil Co. drilled a test about ½ mile from the new location, but went only to the Lakota at 765 ft. Another in the same area drilled 2 years later, stopped in the Lakota at 1,060 ft.

Wilson Creek.—Drilling is to be resumed in the Wilson Creek field, Rio Blanco County, Colorado, as a result of the increasing demand for crude. The field is operated jointly by Texas Co. and California Co., and is the largest in Colorado. Twelve wells have been completed, of which all but an outpost at the north, are good producers in the Morrison and Sundance sands. Last spring, with the completion of 12 Unit, development was suspended for the year as production was equal to requirements. Noble Drilling Co. moved its crew to Wyoming, and the rig was leased to the Frontier Refining Co. for a test at White River. In response to the Government's request for more oil, location is now being made for the first of a series of wells.

Rangely.—California Co. is preparing to open up and test its 1 California-Raven, C NW SE 30-2n-102w, Rangely field, Rio Blanco County, Colorado which was completed in 1933 for 200 bbl. per day of 33-gravity oil in the Pennsylvanian at 6,335 ft. after plugging back from 7,173 ft. It was then shut in and has never been opened since that date. The structure is the largest in Colorado, and produces considerable oil from calcite streaks in the Mancos shale at 600 to 1,500 ft. In the old days several enormous gas wells were completed by Texas Co. and the old Midwest Refining Co. in the Dakota. One of these wells went wild and blew out of control for several months and much of the oil and gas in that horizon is believed to have been dissipated. Then California Co. drilled the deep test with the results noted. It has been rumored, but unconfirmed, that the test of this well is preliminary to deciding upon plans for further development.

WYOMING WILDCAT COMPLETIONS

Hat Six, Natrona County: Blackmore et al 1, SW SW NE 12-32n-78w, plugged at 850 ft.

MONTANA WILDCAT COMPLETIONS

Red Creek district, Toole County: Northern Ordnance, Inc., 1-B State, C SW SW 24-37n-4w, T.D. 2,851 ft., top Colorado 410 ft., Kootenai 2,137 ft., Ellis 2,636 ft., Madison 2,802 ft., dry.

Teton Block, Teton County: Northern Ordnance, Inc., 1 Campbell, C SE NE 5-26n-7w, T.D. 3,925 ft., top of Madison 3,806 ft., plugged.

DAILY AVERAGE PRODUCTION FOR WEEK

	July 31 crude oil	July PAW quota all oils	July 24 crude oil
Arkansas	77,400	77,200	77,400
California	766,250	827,000	770,350
Colorado	6,500	7,000	6,195
Eastern fields	100,150	113,100	99,200
Illinois	215,500	233,000	212,000
Indiana	14,100	14,500	12,400
Kansas	306,150	300,000	306,150
Louisiana	349,050	331,300	349,300
North Louisiana	*84,550*	.....	*85,300*
Louisiana Gulf Coast	*264,500*	.....	*264,000*
Michigan	57,900	60,100	55,800
Mississippi	53,250	50,000	50,500
Montana	21,975	21,800	21,420
Nebraska	2,200	2,200	2,150
New Mexico	104,000	105,700	103,900
Oklahoma	333,500	361,400	332,950
Texas	1,616,750	1,727,000	1,615,600
East Texas	*371,100*	.....	*371,000*
West Texas	*245,650*	.....	*245,600*
North Central Texas	*138,000*	.....	*137,700*
East Central Texas	*123,400*	.....	*128,000*
Texas Panhandle	*90,500*	.....	*90,400*
Texas Gulf Coast	*559,900*	.....	*559,900*
Southwest Texas	*83,200*	.....	*83,000*
Wyoming	96,500	97,200	101,255
Total United States	4,121,175	4,328,500	4,116,570
Total production Jan. 1—July 31, 1943			836,424,700 bbl.
Same period last year			798,011,445 bbl.

MICHIGAN

Osceola Township Well Makes Good Flow of Oil

SAGINAW, Mich.—Sun Oil Co. 1 Clyde Line, completed at 3,738 ft. for initial daily production of 286 bbl. headlined the completions report for Michigan oil fields in the past week. A total of 17 tests were completed, 6 for oil, 1 for gas and 10 dry holes, of which 5 were wildcats.

In the relatively unexplored Wexford County area, Midwest Refineries, Inc., failed to find oil in a Henderson Township test drilled to 3,660 ft. Three of four holes drilled in Missaukee County also were dry, the exception being a 63-bbl. well in Aetna Township. Two of the dry holes were wildcat tests drilled to 4,596 ft. and 4,018 ft. in Enterprise and Forest townships respectively. Oil shows in two wells in Ottawa and Osceola counties were abandoned after acid treating failed to develop in any quantity.

Permits for the year increased to 305 as the state Conservation Department issued 16 more for operations in 11 counties, 3 in Van Buren, 2 each in Bay and Wexford, the others in Allegan, Arenac, Gladwin, Kalkaska, Ottawa, Newaygo and Roscommon.

MICHIGAN WILDCAT COMPLETIONS

Allegan County, Fillmore Township: Mammoth Producing Co. 1 Dick S. Bosch, SW SE NW 1-4n-15w, dry, T.D. 1,604 ft.

Missaukee County, Enterprise County: Sun Oil Co. A-1 State-Enterprise, C S½ SW NW 11-23n-5w, dry, T.D. 4,596 ft.

Forest Township: Gordon Oil Co.-C. L. Maguire, Inc., 1 Mack Miller, C N½ NW SW 27-23n-7w, dry, T.D. 4,018 ft.

Newaygo County, Bridgeton Township: Charles D. Hoffman 1 Stone, C W½ SE SE 23-11n-14w, dry, T.D. 1,323 ft.

Wexford County, Henderson Township: Midwest Refineries, Inc., 1 Wait, C S½ SW SE 29-21n-11w, dry, T.D. 3,660 ft.

ILLINOIS

Edwards County Discovery Flows in Levias Lime

CENTRALIA, Ill.—Twenty-three new oil wells and 18 dry holes were recorded in Illinois in the past week, and in addition three old producing wells, worked over and tested in higher pays, rewarded their owners with substantial initial production. One of these workovers was good for 422 bbl. the first day, another for 450 bbl. initially and a third paid off with 102 bbl. the first 24 hours. The fact that 21 of the 23 regularly completed oil wells produced an average of only 50 bbl. initially, emphasizes the value of the plugged-back wells.

The First National Petroleum Trust made an important discovery in Edwards County with 1 E. Myers, NE NW NW 11-1n-14w, which, after having been acidized in Levias lime (lower O'Hara) at 2,854-65 ft., flowed 6 successive days at an average of 712 bbl. a day with 961 bbl. the first day and 563 bbl. the seventh day. There was no water in evidence. It flowed through tubing much of the time.

Next to the largest producer of the week in review was completed by Pure Oil Co. in 1 Guy St. Clair, SE NW SW 18-6s-7e, Dale-Hoodville pool, Hamilton County. The well had been drilled to 3,251 ft., with no pay in the lower levels. It was plugged back to 2,741 ft. and Tar Springs sand tested at 2,423-88 ft. The well flowed naturally 816 bbl. the first day and 789 bbl., 719 bbl. and 657 bbl. the 3 days following, an average of 745 bbl. per day for 4 days.

Pure Oil Co. completed a second good well in the Dale-Hoodville pool in 1 R. R. Johnston, NW SW SE 18-6s-7e. It had been drilled to 3,210 ft. and plugged back to test upper pays. Pipe was perforated with 108 holes at 2,365-2,401 ft. and the well flowed 35 bbl. per hour. Pipe was then perforated with 18 holes at 2,397-2,403 ft. and the well flowed 312 bbl. in 16 hours.

A second discovery well of the week was Mid-States and Ashland Refining Co. 1 M. Goad, NW NW NW 13-3s-10e, Edwards County. Biehl sand at 1,977-93 ft. was shot, and the well made 15 bbl. of oil and 15 bbl. of water in 24 hours on the pump.

What looks like a pool opener in Edwards County is G. C. Schoonmaker et al 1 Cowling, SW NE SW 20-2s-14w, which swabbed 239 bbl. of oil in 24 hours while cleaning out after a shot in Aux Vases sand at 2,992-3,019 ft., total depth 3,038 ft. It is about 2 miles from other production, and 4 miles north of Grayville.

Phillips Petroleum Co. 1 Johnson, C SW SW 19-4s-11e, White County, swabbed about 14 bbl. per hour from Bethel sand at 2,808-28 ft., total depth 3,151 ft.

Forty-two new operations were reported in the past week including 13 wildcats. These outposts are John J. Farrelly 1 R. Nolin, SW SE NE 21-7n-1w, Fayette County; Smokey Oil Co. 2 R. Johnson, NW NE NE 26-6s-6e, Hamilton County; Sohio Oil Co. 1 Interstate Coal Co., NW NW SE 8-4s-2e, Jefferson County; Smokey Oil Co. 1 Franklin County Mining Co., C NW SW 35-6s-4e, Franklin County; Texas Co. 1 Stokes, SW SW SE 17-2n-1w, Clinton County; Tide Water Associated Oil Co. 1 Eubanks Community, SE SW NE 5-8n-9e, Jasper County; Heath Oil Co. 1 L. S. Heath & Sons, SW SE SE 15-6s-12w, Crawford County; First National Petroleum Trust 1 Roy Paddock, C E½ NE SE 8-3n-10e, Lawrence County; S. C. Yingling 1 W. J. Shaw, NE NE SE 7-1s-12w, Wabash County; Sun Oil Co. 1 Hon-Langfelt, NW SE SW 19-4s-14w, White County.

ILLINOIS WILDCAT COMPLETIONS

Bond County: Aetna Oil 1 Spengel, NW NW SE 29-5n-4w, dry at 3,006 ft., Ste. Genevieve 1,022 ft., Louisiana 2,029 ft., Chattanooga 2,105 ft., Trenton 2,941 ft.

Clay County: Thomas J. Gartland 1 Taylor, SE NW NE 36-4n-7e, dry at 3,000 ft., upper Kinkaid 2,010 ft., Menard 2,218 ft., Tar Springs 2,324 ft., upper Glen Dean 2,418 ft., Golconda 2,499 ft., Barlow 2,588 ft., Cypress 2,637 ft., Paint Creek 2,741 ft., Benoist 2,807 ft., Aux Vases 2,876 ft., Ste. Genevieve 2,930 ft., Fredonia 2,955 ft., McClosky 2,971 ft.

Clinton County: L. L. Benoist 1 C. Varel, SW NE NW 20-1n-3w, dry at 1,314 ft., Cypress 969 ft., Benoist 1,092 ft., Aux Vases 1,156 ft., Fredonia 1,260 ft., McClosky 1,275 ft.

Edwards County: Mid-States and Ashland 1 M. Goad, NW NW NW 13-3s-10e, pumped 15 bbl. oil, 15 bbl. water, Biehl sand 1,977-93 ft., shot, T.D. 3,240 ft., P.B. to 2,100 ft. Pool opener.

Mid-States 1 McKinley, NW NE SE 18-1n-10e, dry at 3,350 ft., lower Menard 2,424 ft., Tar Springs tops 2,599 ft. and 2,617 ft., upper Glen Dean 2,625 ft., lower Glen Dean 2,658 ft., Hardinsburg 2,694 ft., Golconda 2,744 ft., Barlow 2,861 ft., Cypress 2,872 ft., Weller 2,929 ft., Benoist 3,043 ft. and 3,054 ft., Renault 3,095 ft., Aux Vases 3,177 ft., Ste. Genevieve 3,312 ft., no McClosky lime.

First National Petroleum Trust 1 E. Myers, NE NW NW 11-1n-14w, flowed 763 bbl. of oil through tubing from acidized Levias lime (lower O'Hara), flowed 961 bbl. through casing and averaged 712 bbl. a day in 6 days, no water, T.D. 2,873 ft. Pool opener.

Fayette County: F. E. Webb 1 Mueller, SE NW SE 2-4n-1w, dry at 1,652 ft., Glen Dean 1,118 ft., Golconda 1,168 ft., Cypress 1,262 ft., no Weiler sand, Benoist 1,410 ft., Aux Vases 1,470 ft., Ste. Genevieve 1,558 ft., Fredonia 1,594 ft.

Ford County: Nelson et al 1 Erp, SW NW SE 19-24n-7e, dry at 3,955 ft.

Franklin County: J. W. Menhall 1 Kirkpatrick, NE cor. SW SW SE 35-5s-1e, dry at 2,855 ft., McClosky lime 2,760-68 ft.

Hamilton County: H. Gusman 1 Jones-Bell Community, C SW NE 23-5s-6e, dry at 3,340 ft., Menard 2,350 ft., Vienna 2,487 ft., Tar Springs 2,497 ft., Tar Springs sand 2,534-77 ft., upper Glen Dean 2,590 ft., lower Glen Dean 2,619 ft., Hardinsburg 2,646 ft., Golconda 2,729 ft., Barlow 2,845 ft., Cypress 2,867 ft., Paint Creek 3,010 ft., Benoist 3,071 ft., Renault 3,137 ft., Aux Vases 3,159 ft., Ste. Genevieve 3,213 ft., Levias 3,236 ft., Frefonia 3,277 ft., McClosky 3,277-81 ft.

Wayne County: H. H. Weinert 1 M. M. Connell, C NE NW 27-1s-8e, pumped 68 bbl. oil, Aux Vases sand 3,068-87 ft. and 3,094-3,104 ft., shot, T.D. 3,106 ft. Extends South Mount Erie pool.

EASTERN TEXAS

Menziel Discovery Is Offset by Dry Hole

DALLAS, Tex.—Although leasing in the East Texas district continues brisk, drilling activity has dropped to a low point, only 24 rigs actually making hole in the entire area. Wood County continues to hold the interest, with Hawkins and Quitman sharing the active operations. Disappointment for the new Menziel pool was registered last week when Magnolia Petroleum Co. 1 Johnston heirs, east offset to the discovery, was plugged and abandoned at a total depth of 6,503 ft., topping dry Paluxy sand at 6,292 ft. South offset to the discovery appeared to be a small well, it being Magnolia Petroleum Co. 1 Bailey-Howle, which pumped 150 bbl. of oil from pay at 6,280-6,340 ft., producing through open hole. Jackson & Fisher 1 McCarley, Hazard Anderson Survey, which promised Woodbine sand production from 5,428 ft. before being deepened to dry Paluxy sand, dropped 80 joints of drill pipe in sidetracked hole, and it now appears that the hole will be junked and a new one started. One mile east of this test same operators are nearing the Woodbine objective in drilling below 4,800 ft. Five wells in the Quitman pool are drilling or coring near the top of the expected Paluxy sand pay, and should be completed this week. A west outpost, Rogers Lacy 1 Cox, was reported showing very favorable for production, and will extend the pool ¾ mile southwest if it does produce.

Hunt County.—Stanolind Oil & Gas Co. 1 Caston, north offset to the new Paluxy sand producer northwest of Campbell, was shut down for orders at a plugged-back depth of 3,000 ft. after failing to produce in the Paluxy. It drilled to a total depth of 4,800 ft. for geological information after finding the Paluxy partly faulted out at 4,518 ft. A new test for the area 2 miles southwest of Commerce is Stanolind Oil & Gas Co. 1 I. W. Bickley, Paluxy sand test, 1,600 ft. from the north line and 330 ft. from the west line of the Bickley tract, or 2,300 ft. from the south line and 1,200 ft. from the east line of the E. F. Anderson Survey.

EAST TEXAS WILDCAT COMPLETIONS

Hunt County: Ohio Oil 1-A V. Langford, 2,457 ft. from N, 1,904 ft. from E, James Hamilton Sur., 4⅞ miles NE of Quinlan, elev. 484 ft., Pecan Gap 906 ft., Austin 2,185 ft., Eagleford 2,306 ft., Woodbine 2,855 ft., Goodland 4,280-4,335 ft., dry, T.D. 4,481 ft.

SOUTHWEST TEXAS

Wildcat Flows Oil On Drill-Stem Test

CORPUS CHRISTI, Tex. — Eyes turned this week to Willacy County, where Baldridge & King's wildcat, 1 J. C. Cavazos, 6 miles southeast of Willamar, was showing for a producer. On a 24-minute drill-stem test, with perforations at 7,930-59 ft., ⅜-in. choke at bottom and ¼-in. choke at top and using a 1,000-ft. water cushion, the well recovered the water cushion, 1,625 ft. of oil and 30 ft. of drilling mud. Bottom-hole flowing pressure was 900 lb. and shut-in bottom-hole pressure 4,050 lb. The hole is bottomed at 7,959 ft. Preparations were being made to run an electrical survey. This test is being supported by Pan American Production Co. and Standard Oil Co. of Texas, both of which have done prospecting in this area in recent years. After the 1 Cavazos has been completed it is planned to move the rig to 1 Yturria Land & Livestock Co., 5 miles northeast of Yturria, where Texas Co. has spotted location for a wildcat test. Sinclair Prairie Oil Co. was drilling at 4,675 ft. at its 1 C. E. Wertz, a mile east of Raymondville. Besides these three wildcats a fourth in Willacy County has been spotted by Carl I. Olsen. It is the 1 W. Lincoln, 8½ miles southeast of the Willamar field.

Bee County.—Mackhank Oil Co.'s deep wildcat test in the old Cosden oil field set 5½-in. casing at 7,516 ft. and was waiting for cement to set. Pure Oil Co. 1 Nannie Tuttle, 2 miles southwest of Blanconia, at total depth of 5,605 ft., squeezed perforations and was waiting for cement to set. R. P. Brewer, Jr., has derrick up for a wildcat test, 1 J. W. Baird, 3 miles south of Clareville.

Duval County.—With casing perforated at 4,654-60 ft., H. J. Porter et al 1 Robison, 2 miles southeast of the Fitzsimmons field, ran 2-in. tubing. At latest report the well was flowing salt water, gas, and a trace of oil by heads through 7/64-in. choke. Tubing pressure was 180 lb. and shut-in casing pressure 650 lb. Hiawatha Oil & Gas Co. 24 Southland Life Insurance Co., a mile north of the Southland field, was waiting for orders following a 45-minute drill-stem test with ¼-in. chokes at top and bottom and perforations at 5,177-82 ft. The test recovered 180 ft. of gas-cut mud and 1,530 ft. of salt water. Total depth is 5,335 ft.

Live Oak County.—Two more wildcat locations have been spotted. Continental Oil Co. will drill 1 Somerset Land & Cattle Co., a 10,500-ft. test in T.T.R.R. Survey 319, and Henderson Coquat will drill 1 M. T. Buckaloo, a mile northwest of Three Rivers.

Starr County.—New wildcat locations are Lockhart & Davenport 2 Garza, 1¼ miles southeast of the Lockhart field, and Continental 1 Cameron, 2 miles northeast of the Rincon field. John T. O'Neil et al 1 Phillips, 6 miles northwest of the North Rincon field, was drilling below 5,054 ft. Sun, which junked and abandoned its 1 P. L. Salinas, 2 miles southeast of the North Sun field, at 1,048 ft., was drilling at 6,040 ft. in shale in a second hole.

LOWER GULF COAST WILDCAT COMPLETIONS

Jim Wells County: H. H. Howell 1 J. M. Recio, 8 mi. NW of Premont, dry at 6,014 ft.

Refugio County: Tide Water 1 A. D. Rooke et al, 1½ mi. W of La Rosa, dry at 4,500 ft.

SOUTH TEXAS WILDCAT COMPLETIONS

Duval County: Sun 1 E. J. Couling, 5 mi. S of Kreis field, dry at 4,157 ft.

Live Oak County: Continental 3 Albert W. West et al, 1 mi. SW Oakville, 7 bbl. oil and 115 bbl. salt water through ¼-in. choke, T.P. 45 lb., C.P. 650 lb., perf. 1,429-32 ft., T.D. 1,432 ft.

Continental 4 A. West et al, 1½ mi. SW of Oakville, dry at 1,517 ft.

Henderson Coquat 3 E. B. Reagan, 1 mi. W of Oakville, dry at 2,671 ft.

McMullen County: Gulf 1 Two Rivers Ranch Co., 4 mi. SE of Tilden, dry at 6,751 ft. in second sidetracked hole.

Starr County: Judge Bros. 1 Z. Salinas, 10 mi. NW of El Saug, dry at 1,662 ft.

Sun 2-A F. Alvarado, 5 mi. NE of Rincon field, dry at 7,806 ft., P.B. 7,450 ft.

Webb County: Transwestern, Seaboard and Shell 1 Callaghan Land & Pastoral Co., N. W. Taton Sur. 1420, A-2471, dry at 6,260 ft.

RUGGED!

RUGGED is the word for the work done these days by your swamp buggies, earthmovers, tractors, graders! Wherever they are operating they must plow right on regardless of Nature's obstacles. In this continuous, rough service they have to "take it!"

RUGGED is also the word for the extra life and mileage given your tires by a Master Recapping job at Tom P. McDermott, Inc.—*specialists* in recapping and repairing ALL oversize tires and passenger car tires. The best available materials, the most highly skilled tire technicians, the most modern equipment—these are your guarantees of QUALITY at Tom P. McDermott, Inc.—Mid-Continent Area headquarters for Recapping and Repairing.

24 to 36 Hour Industrial and Oil Country Service for Operators in Texas, Kansas, Oklahoma, Arkansas and Louisiana.

Big open steam vulcanizing chamber at McDermott's—cures seven tires at once.

NEW TIRES and "SPECIALS"

If you are eligible for NEW tires, you deserve the finest! We have a complete stock of famous Dayton Tires—"Grade 1" in *all* sizes and treads for *all* commercial and industrial motor carriers. When buying YOUR new tires, get the BEST—DAYTON TIRES.

Our "Specials" department features specific treads for all purposes, and superior resurfacing work on all mechanical rollers or other machinery parts containing rubber!

Tom P. McDermott, Inc.

Phone 3-9188 TULSA 5, OKLAHOMA L.D. 414

TEXAS GULF COAST

Jefferson Wildcat Junked; Second Test Is West Offset

HOUSTON, Tex.—After months of effort to recondition their Jefferson County wildcat 1 Hebert Trust, 4 miles southwest of Viterbo, Glenn H. McCarthy et al have junked and abandoned the hole and have staked location for 2 Hebert Trust, 660 ft. west and 160 ft. south of No. 1. The first well, after being drilled to 10,092 ft., suffered a blowout last May which wrecked the hole and the derrick. It made showings of distillate or oil and of gas. Projected depth of the new well is 9,500 ft. Humble Oil & Refining Co. and Shell Oil Co., Inc., were coring at 10,332 ft. at their 1-C McFaddin Trust, 5 miles southeast of La Belle field, Jefferson County. Sun Oil Co. was waiting for drilling crews to start making hole at 1 B. E. Quinn, 5 miles northwest of Beaumont, Jefferson County. Texas Co. is making a rual completion at 1 Brauer, north extension area of the Stowell field, Jefferson County.

Weber Ogden, Jack W. Frazier, and Ray Ranger have derrick up for a 9,500-ft. wildcat test, 1 E. H. Hooper, a mile northwest of Algoa, Galveston County.

Harris County.—Continental Oil Co. was drilling at 6,370 ft. in shale and sand at 1 J. S. Millenger et al, 2½ miles northwest of Aldine. Ludeau Oil Co. 1 J. E. Ludeau was at 3,110 ft. in sandy shale. This test is 3½ miles north of Houston. H. C. Cockburn was drilling at 2,818 ft. in shale at 1 R. E. Allday. Texas has applied for permission to make a dual completion at 52 Stevenson, which has opened Yegua sand production on the east flank of the Humble dome.

Jackson County.—Renwar Oil Corp. has staked location for an outpost test, 1 Landsdowne, in the Menefee Survey, Mustang Creek field, 1¾ miles southwest of Ganado. Akron Production Co. was coring ahead from 2,477 ft. at its wildcat, 1 Weardon, 3 miles north of Cordelle. Humble Oil & Refining Co. was drilling at 3,843 ft. in shale at 1 C. L. Hensley, a 9,000-ft. test 5 miles south of Lolita.

Liberty County.—W. W. West has staked location for 1 West et al, a projected 10,000-ft. wildcat in the Davis Hill dome area. Humble and Gulf Oil Corp. are reported to be supporting this test. William Helis has spotted location for 1 Hirsch estate, 7½ miles southeast of Devers.

TEXAS GULF COAST WILDCAT COMPLETIONS

Fort Bend County: O. W. Killam Co. 1 J. R. Nesbitt, 1½ mi. NW of Fulshear, dry at 7,772 ft.

Harris County: H. C. Cockburn 1 M. Esperson, 6 mi. NE of Houston (core test), dry at 4,553 ft.

36-inch valve with welding end, carbon-moly body and four to six per cent chrome-moly vane. Equipped with alloy shafts and bushings, finned lubricated stuffing box and hydraulic cylinder with positioner. The auxiliary heavy duty hand wheel control is equipped with self-locking worm and gear and declutching unit.

Standard 125 lb hand lever operated valve. Can be equipped with hand wheel, chain lever or chain wheel. An extension shaft is provided for inaccessible locations.

R-S

15 to 900 psi
for air, gas, steam, liquids and semi-solids

A glance at the design of an R-S Butterfly Valve indicates that there is practically no restriction to the flow. The carefully-machined body bore and streamlined vane offer minimum resistance. In fact, the flow conditions are similar to those produced in a venturi tube with high pressure recovery on the downstream side.

It is apparent that the pressure loss in a wide open R-S Butterfly Valve is considerably less than in most conventional types of wedge gates. Add to this the fact that there are no pockets to collect sediment. When the vane approaches a closed position, the valve tends to clean itself.

Shut-off is accomplished by the beveled vane which wedges tight against the valve body. Four to six revolutions of a hand wheel completely open or close the valve vane. Accurate control and shut-off by hand or automatic equipment is a simple matter.

Where hard wear and severe stresses are encountered, the use of R-S "A" metal will produce outstanding results and increased service. Specify R-S Butterfly Valves for reduced maintenance.

Catalog No. 16-B contains detailed specifications. Write for your copy.

VALVE DIVISION
R-S PRODUCTS CORPORATION
4538 Germantown Avenue • Philadelphia 44, Pa.

R-S Streamlined BUTTERFLY VALVES

Jefferson County: Glenn H. McCarthy, Inc., 1 Hebert Trust, 4 mi. SW of Viterbo, junked and abandoned at 10,092 ft.

Montgomery County: Gar-Flo and R. E. Hanrick 1 Calfee and Longmire, 4 mi. NW of Conroe, dry at 4,808 ft.

N. CENTRAL TEXAS

Strawn Sand is Second Pay At Browning Pool

WICHITA FALLS, Tex. — Perry Browning 3 fee, Section 6, Block 89, German Emigration Survey, in the Browning pool which produces from the Ellenburger dolomite, opened a new Strawn sand pay horizon when it flowed 69 bbl. of 43-gravity oil in 2 hours through ¾-in. choke on tubing from 4,925-80 ft., after being shot with 170 qt. The well is bottomed at 4,980 ft. Two miles north of Scotland, S. D. Johnson 1 Williams indicated a possible Caddo conglomerate pool when it showed 22 bbl. of oil in the hole after cleaning out following acid treatment of 1,000 gal. and the showing was to be shot. Total depth is 6,014 ft. E. C. Norwood, estate, 1 Lorena Kinder, wildcat in Block 5, Clark & Plumb subdivision, east of Archer City, had lime showing oil from 5,160-85 ft., and an attempted drill-stem test failed, and the well was drilling ahead. L. T. Burns 14 Ickert, Block 17, Crawford Pasture subdivision, southwest part of the county, total depth 5,165 ft., perforated opposite Mississippi lime from 5,011-65 ft., failing to produce, and the perforations were squeezed and the lower Caddo zone from 4,582-90 ft. was perforated with 20 shots and treated with 1,000 gal. acid.

Montague County.—R. H. Dearing & Sons 1 H. D. Field, Block 24, Field Survey, 4 miles east of St. Jo, Ellenburger wildcat slated to go to 8,000 ft., had shows of dead oil from Ellenburger from 7,251-7,300 ft., and was drilling ahead below 7,460 ft. in hard conglomerate. Stanolind Oil & Gas 1 Reed, Section 48, Belcher subdivision of Guadalupe College Survey, 3½ miles west of Nocona, perforated with 120 shots from 5,740-60 ft., treated with 1,000 gal. acid, and was cleaning out. New 7,200-ft.

Wichita County.—Continental Oil 1 G. T. West, Strawn sand discovery west of Wichita Falls, plugged back to 5,260 ft. from 5,687 ft in dry Ellenburger, flowed 65 bbl. oil in 9 hours through 12/64-in. choke on 2-in. tubing, natural. Casing pressure dropped from 675 lb. to 175 lb. during the test, and tubing pressure declined from 510 lb. to nothing.

Shallow show of oil was encountered from 1,108-1,200 ft. in Continental Oil 1 J. R. Davidson, 6,400-ft. Ellenburger wildcat in Parker County, located 6½ miles northwest of Weatherford in Section 242, T.&P. Ry. Survey, but no test was made of the showing.

Drilling has started on a 6,600-ft. wildcat in Foard County. It is the Texas Co. 1 W. H. Nichols et al, located 660 ft. from east, 3,456 ft. from north, Section 298, Block A, 9 miles southeast of Crowell.

NORTH TEXAS WILDCAT COMPLETIONS

Archer County: Dillard & Gulf Oil 1 Luke McCrory, trustee, 1,980 ft. from N and E, Lot 83, A.T.N.C.L. Subd., elev. 1,032 ft., sand showing oil 3,816-20 ft., Ellenburger 5,451 ft., dry, T.D. 5,617 ft.

Clay County: L. T. Burns 1 Joe P. Thompson, 500 ft. from N, 556 ft. from W, Blk 29, Webb Subd., San Augustine Univ. Sur., 4½ mi. NE of Joy, flow 1,197 bbl., ¼-in. choke on tubing, sand showing oil 3,850-68 ft., 4,015-90 ft., 4,545-60 ft., Caddo lime 5,533 ft., show oil 5,580-5,600 ft., Mississippi lime pay 5,972 ft., T.D. 6,044 ft. Discovery.

WEST CENTRAL TEXAS

ABILINE, Tex.—Final completion was announced for a new pool opener in Stephens County, J. D. Hancock et al 1 Black Brothers, which made 22.26 bbl. oil plus 74 per cent water on potential test from Caddo lime from 3,252-93 ft. The test had drilled to Ellenburger at 4,602 ft., passing Marble Falls lime at 3,920 ft., and Mississippi lime at 4,369 ft., with gas and oil shows in both. It has been plugged back to 3,293 ft. for completion, where it has been shut in for several months. A northeast offset is planned in the near future by Hill & Hill.

Flow of 1,200 bbl. oil per day was registered by Maracaibo Oil Exploration 2 Wimberly, Wimberly pool, Jones County, based on flow of 150 bbl. in 3 hours of potential test. Oil is coming from 2,356-2,429 ft., Cisco series, and is 44 gravity. This well was drilled with rotary rig, the first well in the area to be so drilled, and now that the thin pay sections, there being four different pays in the pool, have been carefully studied, rotary drilling may be expected in many additional wells.

Fain & McGaha 1 E. A. Paterson, southwest offset to the Patterson pool opener, had drilled to 2,085 ft., and appeared to be running 15 ft. low to the producer, indicating a small structure in the Tannehill sand. If this well is dry, it will probably be temporarily abandoned and another well drilled east of the producer, which will be carried to the Wimberly pays, prime objective of wells in this area.

WEST CENTRAL TEXAS WILDCAT COMPLETIONS

Jones County: Harold G. Neely et al 1 A. A. Hayden. SE NE Lot 5, G. Martinez Sur., Sec. 195, dry, T.D. 2,163 ft.

Watchorn Oil & Gas 1 I. B. Ray, 330 ft. from S and W, 300-ac. lease, Sec. 11, Block 17, T.&P. Ry. Sur., 2 mi. SW of Truby, elev. 1,720 ft., dry, T.D. 2,825 ft.

Shackelford County: Shell Oil 1 J. B. Matthews, 330 ft. from N, 1,650 ft. from E, Sec. 35, Blind Asylum Land, elev. 1,358 ft., lime 3,155 ft., S.S.O., dry, T.D. 4,582 ft.

Stephens County: J. D. Hancock 1 Black Bros., 467 ft. from SE and SW, Sec. 1144, T.E.&L. Sur., elev. 1,144 ft., Caddo lime 3,252 ft., Marble Falls lime 3,920 ft., Mississippi lime 4,369 ft., Ellenburger 4,437 ft., pump 22 bbl., 74 per cent water, pay 3,252-93 ft., perf. 114 shots 3,251-70 ft., acid 4,000 gal., T.D. 4,602 ft. Discovery.

LOUISIANA GULF

New Wildcat Activity Reported in Acadia Parish

NEW ORLEANS, La.—Acadia Parish, with new wildcat projects announced, is a center of rising interest. Sun Oil Co. and Continental Oil Co. are rigging up for a 12,000-ft. test, 2 Homeseekers Development Co., on the Estherwood prospect, 54-10s-1w. About 2 years ago Sun and Continental assembled a block of 5,000 acres, centering 16-10s-1w, in the Estherwood area, paying $7.50 an acre bonus for 5-year commercial leases. Union Sulphur Co., Inc., has staked location for 1 Edward E. Daigle in 49-7s-2e, 1¼ miles southwest of Church Point. Continental 1 Acadia Parish School Board, a mile north of the Richie field, flowed 85 bbl. of oil through 8/64-in. choke on a 12-hour gage, with perforations at 8,586-91 ft. Tubing pressure was 2,300 lb. and casing pressure 4,011 lb. This wildcat bottomed at 9,909 ft., had been plugged back to 8,595 ft. It was still testing as the week closed. Amerada Petroleum Corp. 1 Daigle was drilling in shale at 10,189 ft. It is 1¼ miles northeast of Church Point.

Terrebonne Parish. — Union Oil Co. of California has applied for permission to abandon its wildcat, 1 Calvert & Todd, a mile north of Houma. It reached a total depth of 12,009 ft. in shale. Humble Oil & Refining Co. 1-C Continental Land & Fur Co., 4 miles south of the Gibson field, was at 9,457 ft. in shale, with streaks of lime.

St. Landry Parish.—Sun 1 Dr. O. P. Daly, 175-7s-4e, completed dry at 10,693 ft., has marked the limits of the northwestern edge of the New Shuteston field. At 9,570 ft. an electrical survey showed the well to be running 70 ft. lower than the discovery well, Sun 1 Burleigh. At total depth the well was still approximately 70 ft. low.

Evangeline Parish. — An electrical survey from 11,879 to 11,478 ft. at Danciger Oil & Refining Co. 1 Hattie Haas, in the Reddell area, indicated that all sands bore salt water. As the week closed, the well was drilling at 12,045 ft. in sand. It was planned to carry the hole to 12,300 ft.

East Baton Rouge Parish. — Shamrock Oil Co. 1 L. B. Phillips, in the Hallett's Bluff area, was drilling at 8,095 ft. in lime. It topped the first Heterostegina at 7,420 ft. and the Heterostegina lime at 7,660 ft.

KANSAS

Kansas Field and Wildcat Drilling at High Pace

KANSAS operators wound up an unusually busy week with four discovery wells completed in as many counties. There were 46 first reports, compared with 40 for the previous week. This activity reflects the increased trend in operations that has gone on over the past several months.

At least three new wildcats were showing for oil wells. In Cowley County, Northern Ordnance Co. had a 30-bbl. well at its 1 Ramey, in NW SW 20-33-8e. It is in the Kansas City lime at 2,796-2,811 ft. In southeastern Reno County, north of the Hilger pool, Phillips Petroleum Co. 1 Manning, SW SW NW 34-25-4w, had lime from 3,662-4,102 ft., drilled plug and had 3,800 ft. of 41-gravity oil in the hole in 3½ hours. The discovery is reported to be on a block of 1,650 acres. A new Lamott sand well was reported in Barton County. It is Shirley L. Clumm 1 Bahr, CNL NE SW 26-18-15w, east of the Otis-Albert gas field. On last report it was flowing an estimated 6 bbl. of oil an hour in sand at 3,470-3,506 ft. Nearest production is on the other side of the gas field, some 6 miles west.

KANSAS WILDCAT COMPLETIONS

Barton County: National Ref. 1 Panne, NW NW NE 25-19-13w, dry, T.D. 3,485 ft., Lansing 3,171 ft., Arbuckle 3,438 ft.

Herbert Gussman 1 Ruscoe, NW NW NW 16-19-12w, dry, T.D. 3,481 ft., Lansing 3,156 ft., Arbuckle 3,439 ft.

Vernon, Alpine & Brunson 1 Hitchman, S½ SE NE 28-16-12w, dry, T.D. 3,440 ft., Lansing 3,112 ft., sand 3,424 ft.

Transwestern Oil 1 Deckert, SE NE SW 16-20n-15w, dry, T.D. 3,815 ft., Lansing 348 ft., Arbuckle 3,794 ft.

Edwards County: Cities Service 1-B Wilson, SE NW SW 4-25-16w, pumped 132 bbl., Lansing 3,933-38 ft., 3,957-71 ft., T.D., swabbed and flowed 330 bbl. in 24 hr., discovery of Belpre pool.

Elk County: Simpson Oil 1-A Dixon, SE NE SE 19-28-9e, dry, T.D. 2,928 ft., Mississippi lime 2,585 ft., Arbuckle 2,920 ft.

Ellis County: Coralena Oil 1 Glathart, SE SE SE 16-12-19w, pumped 275 bbl., Lansing 3,504-14 ft., T.D. 3,560 ft., discovery of Glathart pool.

Marion County: Adair & Morton 1 DeMand, NE NE SE 15-18-4e, dry, T.D. 2,375 ft., chat 2,302 ft., show oil 2,319 ft.

Ottawa County: Auto-Ordnance 1 Gekler, NW NW NW 20-12-2w, dry, T.D. 3,510 ft., Lansing 2,190 ft., Hunton 3,060 ft., Viola 3,293 ft., Arbuckle 3,479 ft.

Rush County: Phillips 1 Pechanec, SE SW 18-18-16w, dry, T.D. 3,602 ft., Lansing 3,258 ft., Lamott sand 3,572 ft., granite wash 3,596 ft.

Saline County: Wolf Creek 1 Karber, S½ SW SE 9-16-1w, flowed 86 bbl., 34-gravity, Lansing 1,989-2,000 ft., discovery of Gypsum pool, oil trucked by White Eagle division.

Scott County: Stanolind 1 Hattie Turpin, NW NW NW 16-19-31w, dry, T.D. 5,164 ft., Lansing 4,060 ft., Mississippi lime 4,594 ft., Viola 4,963 ft., Arbuckle 5,144 ft.

Stafford County: Skelly 1 Campbell, SW SE SW 34-24-15w, 3,000 bbl. potential, filled up 3,200 ft. in 1 hr., no tanks available for test, Arbuckle 4,419-33 ft., discovery of Farmington pool.

MISSOURI

ST. JOSEPH, Mo.—Nebraska Producing & Refining Co. has completed 1 Wilkinson, C E½ SW SW 3-1n-14e, Richardson County, Nebraska, in the Dawson pool. The well is expected to yield around 150 bbl. of oil per day. The Hunton limestone was topped at 2,173 ft. and cement plug was drilled to 2,191 ft., after which the hole was acidized with 1,000 gal. The same company was drilling below 1,950 ft. at 2 Bohrer in the same pool, C E½ NE NW 10-1n-14e.

OKLAHOMA

Pottawatomie County Has New Hunton Lime Well

A NUMBER of wildcats were nearing completion last week as commercial oil wells. In Pottawatomie County, at the southwest edge of Shawnee, Atlantic Refining Co. was opening a new Hunton pool at its 1 Muck, NE NE SW 24-10n-3e, which flowed 87 bbl. of oil into tanks in 13 hours. The well was drilled to 5,511 ft. but plugged back and perforated in the lime at 5,110-20 ft., 5,136-46 ft. and 5,146-56 ft. The flow was made after acid treatment.

Oklahoma County.—The West Edmond pool is the scene of active drilling. Northeast and southwest offsets have oil in the hole and are nearing completion and six other tests are under way, which if successful, will prove up some 400 acres.

Garvin County.—Ohio Oil Co. 1 Burns, SE NE SW 17-3n-2e, gas discovery in Pennsylvanian sand at 2,876 ft., was reported to be making in excess of 100,000,000 cu. ft. of gas daily. Total depth was 2,903 ft. The well blew wild for over a month until a relief well was drilled to release the pressure.

OKLAHOMA WILDCAT COMPLETIONS

Garvin County: Pure Oil 1 Allison-Weld, NE SW NE 24-3n-1w, dry, T.D. 4,650 ft., base Pennsylvanian and top Trenton 3,996 ft., bromide 4,308 ft., gas-cut mud at 3,966 ft.

Lincoln County: Wilcox 4 Kolan, NW SW 5-12n-6e, dry, T.D. 4,651 ft., Hunton 4,340 ft., Viola 4,523 ft., Wilcox 4,596 ft., second Wilcox 4,632 ft.

Logan County: Anderson-Prichard 1 Morgan, NW NE 33-16n-1w, dry, T.D. 5,342 ft., Bartlesville 5,237 ft., shot and swabbed 6 bbl. of oil.

Okfuskee County: J. G. Buell 1 Schultz, SE SE NW 13-10n-8e, dry, T.D. 3,680 ft., Bartlesville 2,730 ft., Cromwell 3,585 ft.

Amerada 1 Kennedy, SE NE NW 27-12n-10e, dry, T.D. 3,891 ft., Hunton 3,506 ft., Viola 3,725 ft., Wilcox 3,770 ft., show gas 3,583 ft.

Pawnee County, 1½ mi. SW of E. Watchorn: Watchorn Oil & Gas 1 Laird, SW SW 2-22n-3e, dry, T.D. 4,234 ft., Bartlesville 3,700 ft., Misener 4,184 ft., sandy dolomite 4,193 ft., Wilcox 4,222 ft.

NORTH LOUISIANA

Columbia County Wildcat Is Dual Completion

SHREVEPORT, La.—Tide Water-Seaboard 1 A. O. Young, a wildcat in NE SE 18-18s-19w, 4 miles west of the Atlanta pool in Columbia County, was brought in last week as a dual completion. Production was found in both the Cotton Valley and Smackover zones. First perforations at 7,210-12 ft. showed gas and a second set at the same depth flowed oil and salt water. These were squeezed off and holes made at 7,212-16 ft., in the Cotton Valley, which resulted in a flow of 387 bbl. of oil, cutting 5 per cent water, in 24 hours. Perforations were then made in the Smackover at 8,294-8,300 ft. and the well flowed 779 bbl. of oil a day, with a flowing pressure of 1,110 lb. Operators did not specify, but apparently this flow was from both zones. Shut-in pressure was 3,400 lb.

This well is an important strike and will open a large area for immediate drilling. The nearness of the Atlanta pool, where production is in the Smackover at 8,200 ft., offers a possibility of joining the two pools.

ARKANSAS WILDCAT COMPLETIONS

Columbia County: Tide Water-Seaboard 1 A. O. Young, NE SE 18-18s-19w, flowed 252 bbl. through 9/64-in. choke, perf. 8,294-8,300 ft., 7,212-16 ft., gas-oil ratio 860:1, gravity 44.8.

NORTH LOUISIANA WILDCAT COMPLETIONS

Bossier Parish: A. D. Simpson 1 Fenet, NW SW NE 25-21n-14w, dry, T.D. 1,061 ft.

Caddo Parish: H. C. Owens et al 1 Caddo Levee Board, SE SE SE 12-22n-16w, dry, T.D. 6,000 ft.

Durbin Bond et al 1 Simpson, SW SE 17-16n-15w, dry, T.D. 6,172 ft.

Grant Parish: Youngsblood-Foree, NW SE 22-7n-1e, dry, T.D. 4,572 ft., Cook Mountain 1,660 ft., Sparta 1,841 ft., Wilcox 2,734 ft.

MISSISSIPPI

JACKSON, Miss.—Gulf Refining Co. 1 Aden Davis, Wayne County wildcat in 2-9n-9w, which had given promise of being a pool opener, was evoking diminished enthusiasm this week following a drill-stem test that showed salt water but no oil. All perforations were squeezed off, and the test was waiting for cement to set. A show of oil was reported at about 5,200 ft., but it is said to have been determined that the well would not produce oil commercially there. California Co. 1 National Gasoline Co. of Louisiana, Inc., 16 miles east of Natchez, in Adams County, was running an electrical survey at total depth of 9,460 ft.

MISSISSIPPI WILDCAT COMPLETIONS

Greene County: Gulf 1-A School Land, 16-3n-7w, dry at 2,135 ft.

PERMIAN BASIN

Saturated Lime Found in Andrews County Wildcat

MIDLAND, Tex.—Union Oil Co. 1 J. D. Biles, NW NE Section 19, Block A-31, Public School Land, 5 miles northwest of the Fullerton pool in northwest Andrews County, indicated a possible new pool when it showed some saturation in lime from 6,945-7,005 ft., with best saturation from 6,955-75 ft. Drill-stem test, open 60 minutes, showed 100 ft. drilling mud with a very light show of oil through ½-in. choke on bottom, and was decided to carry the test on down to 7,400-ft. contract depth, and if no shows are found, to plug back and treat the saturated zone with acid. At last reported depth the well was drilling below 7,051 ft. in dolomite. Humble Oil & Refining 1 Crews & Mast, Section 8, Block A-34, Public School Land, took 30-minute drill-stem test from 7,700-8,002 ft., which showed 7,500 ft. sulfur water, no oil or gas. In the southeast part of the county, Texas Co. has staked location for a 5,500-ft. test, to be 1 John Mabee, located 1,998 ft. from south, 970 ft. from west Section 37, Block 40, G.&M.M. B.&A. Survey, 2 miles east of a 5,149-ft. dry hole drilled by Texas Pacific Coal & Oil Co. in March 1942. Skelly Oil Co. 1-K University, Holt pay discovery east of Emma pool, pumped 149 bbl. the first 18 hours of potential test, 3 per cent basic sediment and 1½ per cent water.

Pecos County.—Standard Oil Co. of Texas 1 Douglas Oil Co. et al, SE SE Section 9, Block 194, G.C.&S.F. Ry. Survey, was preparing to retreat with acid through perforations 8,697-8,732 ft., after it recovered only a small amount of oil after treatment with 5,000 gal. acid. Twelve miles north of Fort Stockton and 3 miles southeast of a dry hole drilled to 7,608 ft. last year, Magnolia Petroleum has staked location for another basal Permian test, to be 1 Robertson-State, 660 ft. from south, 1,980 ft. from west, Section 2, Block 142, T.&St.L. Ry. Survey, scheduled to go 8,000 ft. Magnolia and Anderson-Prichard 1 Powell-State, discovery northeast of the Apco-Warner pool, on last gage flowed 100 bbl. of oil and 600 bbl. water in 24 hours through 1-in. choke, and was still testing.

SOUTHEAST NEW MEXICO

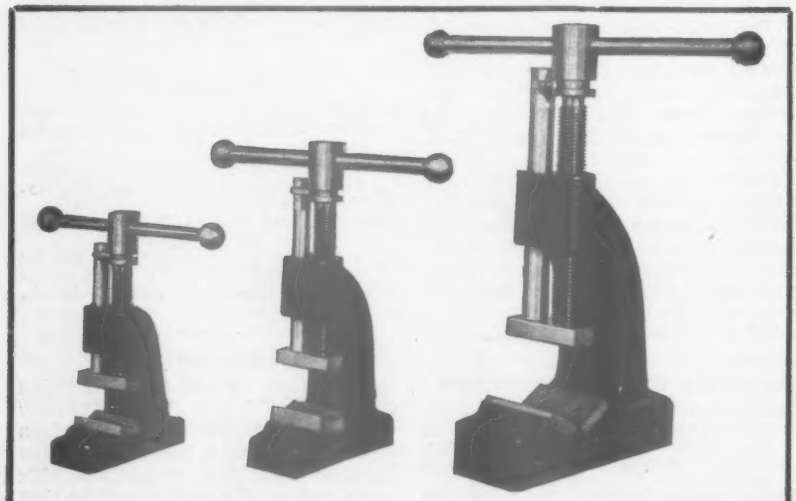
HOBBS, N. M.—Schuster & Messenger 1 Pake, SW SW Section 15-21s-28e, Eddy County, south of the Russell pool, definitely opened a new pool when it pumped 15 bbl. of 44-gravity oil in 12 hours while testing. The well topped the Delaware sand at 2,620 ft. and had saturation at 2,638-44 ft., bailing 2½ bbl. per hour. It was shot with 20 qt. from 2,633-49 ft. and swabbed 2½ bbl. of oil per hour for 8 hours, indicating no improvement by the shot. Total depth is 2,649 ft.

Robert McKee 2 State, SE SE 3-19s-29e, wildcat discovery prospect, total depth 2,815 ft., plugged back to 2,710 ft., shot 340 qt. from 2,575-69 ft., and bailed 60 per cent oil and 40 per cent water while cleaning out. Prior to being shot the well had bailed 16 bbl. oil and 6 bbl. water per day after having been deepened from 2,600 ft. from which depth it had swabbed 30 bbl. oil per day after treatment of 3,000 gal. of acid.

Maljamar Oil & Gas Co. 2 Cheesman, NE NE 22-18s-31e, Lea County, south of the Maljamar pool, was testing after running 2-in. tubing to a plugged-back depth of 4,795 ft. It had been shot with 90 qt. from 4,771-90 ft. and 180 qt. from 4,630-76 ft., swabbing 100 bbl. per day with some water. Total depth is 4,840 ft.

PANHANDLE

AMARILLO, Tex.—Failure appeared for Stanolind Oil & Gas Co. 1 Corbin, Armstrong County wildcat south of Claude, in Section 275, Block B-4, H.&G.N. Ry. Survey, when it hit granite at 6,120 ft. and ran an electric log. The well had drilled through a 100-ft. section of sand at about 5,600 ft. but no shows of oil or gas were encountered in the section.



"TOLEDO" OPEN-SIDE PIPE VISES

Malleable iron frames. Hardened steel jaws. Quick-acting heat-treated vise screw. Ample length handles for leverage. Excellent for fitting make-up work. Furnished in three sizes.

No. 00 holds ⅛" to 1½" pipe.
No. 0 holds ⅛" to 2½" pipe.
No. 3 holds ⅛" to 4½" pipe.

THE TOLEDO PIPE THREADING MACHINE CO.
TOLEDO, OHIO NEW YORK OFFICE No. 2 RECTOR ST.
"TOLEDO"

BUY WAR BONDS AND WAR STAMPS

APPALACHIAN FIELDS

Columbian Carbon Well in Union District Is Gasser

PITTSBURGH, Pa. — No important developments were reported in the deep tests now drilling. In West Virginia a large gas well was completed in Kanawha County after acidizing in the Big lime. In the lower eastern fields, 19 completions were reported of which 4 were dry, 12 gas wells and 3 producers with a daily initial of 42 bbl.

WEST VIRGINIA

Gilmer County.—In Center district, Gilmer County, Hope Natural Gas Co. is drilling at 2,565 ft. in the Oriskany test on the Susan Stump farm.

Boone County.—In Peytona district, Boone County, Owens, Libbey-Owens Gas Department is drilling at 4,912 ft. in the test on the Coal River Mining Co. and at 5,248 ft. in the Bull Creek Coal Land Co., having reached the Newberg horizon at 5,234 ft.

Raleigh County.—In Slab Fork district, Raleigh County, Godfrey L. Cabot, Inc., is running 7-in. casing at 2,830 ft. in 1092 Rockhouse Fork Land Co. The top of the Big lime was 2,791 ft.

KEEPING CADENCE WITH WARTIME OIL DEMANDS

The hum of big motors on the Big-Inch Pipe Line . . . and the zing of electric pumps operating in high octane refineries . . . and the rhythm of electrically driven units in the oil field and gigantic synthetic rubber plants . . . these remind you of the fast cadence attained by *Utility Electric Power* today. Each time oil requirements are increased the Utility Electric Power industry also has quickened its cadence to keep abreast. Thus, in war or peace, *Utility Electric Power* is geared to the tempo of each new day. It's your most valuable modern servant. So safeguard your motors and electrical equipment. Conserve wherever possible. Help us keep cadence with increasing wartime demands.

Use Utility Electric Power!

PETROLEUM ELECTRIC POWER ASSOCIATION

Box 1498, Oklahoma City, Oklahoma

OHIO, KENTUCKY

Pike County Shows Increased Drilling

ZANESVILLE, Ohio. — A 243-bbl. well was completed by the Preston Oil on the Madden tract in the Clayton pool on an outside location to the southwest. The Clinton sand was found at 3,096-3,144 ft. Although this well proves some additional acreage, the limits of the pool have been nearly reached in this direction as drilling now has almost reached the old Reading gas pool. The limits of the pool in all other directions have not yet been defined, and outside locations are now being drilled to the north, east and south.

A 60-bbl. well was completed by the Ohio Oil in Clinton sand at 3,353-74 ft. in their discovery pool west of the Layland pool in Coshocton County. It is not expected that this well will encourage much additional drilling at this time as the oil is classed as Corning grade, which borders on unprofitable production.

OHIO COMPLETIONS
Wildcats

Medina County, Granger Township: Ohio Fuel 1 A. J. Flynn, Lot 20, Clinton 3,418-46 ft., dry, T.D. 3,492 ft.

Perry County, Madison Township: Atha 1 fee, Sec. 27, Clinton 3,350-97 ft., dry T.D. 3,506 ft.

WESTERN KENTUCKY

OWENSBORO, Ky.—Kingwood Oil Co. 1 A. Jones, 6 miles southeast of Henderson, was shut down at 2,600 ft. and looks like a dry hole. Another wildcat, Calstar Petroleum Co. 1 Mason, in Union County, was dry at 2,589 ft. Four oil wells with an average initial production of 386 bbl., were completed, three in Henderson and one in Union County. Four dry holes were reported in the course of the week.

WESTESN KENTUCKY WILDCAT COMPLETIONS

Union County: Calstar 1 L. Mason, dry at 2,589 ft., Menard 1,783 ft., Vienna 1,853 ft., Tar Springs 1,858 ft., upper Glen Dean 1,976 ft., lower Glen Dean 1,990 ft., Golconda 2,114 ft., Barlow 2,212 ft., Cypress 2,299 ft., Renault 2,406 ft., Ste. Genevieve 2,496 ft., McClosky 2,576-84 ft.

EASTERN KENTUCKY

ASHLAND, Ky.—Pike County held the spotlight with five gas-well completions this week, while a month-end report lists an additional half dozen gas wells and shows an additional production of 8 bbl. of oil after shot, in a well reported previously. However, a deep test on Levisa Fork, in Pike County, was a dry hole.

The Pike County completions point to the steady drilling in that part of the state with wildcatting operations edging southward.

Martin County completions for the week total four while several new locations were reported in Knott County.

Completion of well No. 1 on the Roy Fairchild land on Rockhouse Creek in Johnson County marks up another of the Big Six wells drilled in that field in the past 1½ years. The well was completed by Harfield Gas Co. at a total depth of 2,410 ft. with an open flow of 500,000 cu. ft. of gas. Most of the wells in the field have been of about this size.

INDIANA

EVANSVILLE, Ind.—Six dry holes, including one wildcat, comprised the completed list of wells in Indiana during the week in review. The failures were scattered in Clay, Daviess, Gibson, Posey and Spencer counties.

INDIANA WILDCAT COMPLETIONS

Posey County: J. Y. Melborn 1, NW SW SE 12-7s-12w, dry at 1,900 ft., lower Menard 1,791 ft., Waltersburg 1,831 ft., Vienna 1,859 ft., Tar Springs 1,886-95 ft. and 1,898-1,900 ft.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, General Land Office, District Land Office, Salt Lake City, Utah. Notice is hereby given that the lands herein described within the known geologic structure of the Cisco Dome Gas Field, Utah, are offered to qualified bidders of the highest amounts offered per acre as a bonus for the privilege of leasing the land under section 17 of the leasing act, as amended by the act of August 21, 1935 (49 Stat. 674, 30 U.S.C. 226) at a sale to be held in the United States Land Office at Salt Lake City, Utah, at 10 a.m., August 20, 1943, in the following units: Parcel No. 1, T. 20 S., R. 21 E., sec. 3, lots 1, 2, S½NE¼, SE¼; sec. 10, E½. Parcel No. 2, T. 20 S., R. 21 E., sec. 3, lots 3, 4, S½NW¼, SW¼; sec. 10, W½. Parcel No. 3, T. 20 S., R. 21 E., sec. 4, SE¼NE¼, NE¼SE¼, S½SE¼; sec. 9, E½. Parcel No. 4, T. 20 S., R. 22 E., sec. 20, W½SE¼; sec. 29, E½. Parcel No. 5, T. 20 S., R. 22 E., sec. 20, SW¼; sec. 29, W½. Parcel No. 6, T. 20 S., R. 22 E., sec. 30, lots 1, 2, 3, 4, E½, E½W½. Parcel No. 7, T. 20 S., R. 21 E., sec. 22, SE¼SW¼; sec. 26, N½, N½SE¼, SE¼SE¼; sec. 27, N½NE¼, SE¼NE¼. Parcel No. 8, T. 20 S., R. 22 E., sec. 31, lots 1, 2, 3, E½, E½NE¼, NE¼SW¼; T. 21 S., R. 22 E., sec. 5, NW¼NW¼ (unsurveyed); sec. 6, NE¼NE¼ (unsurveyed). Each lease will be made subject to the unit plan for the Cisco Dome Unit Area, Utah, approved June 6, 1942. Mimeographed copies of the plan will be available for distribution to parties interested in bidding at the local land office in Salt Lake City, Utah, and offices of the oil and gas leasing division, Geological Survey at Salt Lake City, Utah, Casper, Wyoming, and Washington, D. C. Upon acceptance by the Secretary of the Interior of any bid for the unsurveyed tracts they will be surveyed at Government expense. Each successful bidder must deposit on date of sale with the officer in charge of the sale a certified check on a solvent bank or cash for one-fifth of the amount bid by him and file a showing of qualifications to receive a lease as required by section 7 of Circular 1386. The remainder of the bonus bid and annual rental must be paid prior to the issuance of the lease. Each parcel will be offered for sale separately, but bidders may submit bids for two or more parcels regardless of the acreage involved, since each lease will be made subject to and operated under a prescribed unit plan of development and operation. Bids may also be submitted by mail provided they are accompanied by one-fifth of the bonus bid and a showing of qualifications of the bidder. The envelope must be plainly marked for opening on the day and hour of the sale. Bidders are warned against violation of section 59, United States Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids in the discretion of the Secretary of the Interior. Scott P. Stewart, Register.

CANADIAN FIELDS

Turner Valley Extension Granted High Allowable

CHATHAM, Ont.—In the Turner Valley north extension, British Dominion 5, LSD 5, 17-21-3w5, finished at 8,598 ft. with Madison limestone at 8,169 ft., has been granted an allowable of 950 bbl. daily, the highest in the field, and 375 bbl. daily in excess of the next largest producer, Home Oil 2. The allowable is the highest ever granted in Turner Valley under the Brown conservation plan, which has a top rating of 1,000 bbl. daily. Flush production ran as high as 200 bbl. an hour, or at the rate of 4,800 bbl. daily. The well is the most northerly producer yet completed, extending the proven field ¼ mile north of Atlas-British Dominion 2. British Dominion 6 has been spotted as an easterly offset in LSD 6 and British Dominion 7 as a northerly offset in LSD 12, both in 17-20-3w5.

Southern outpost.—Brown Oil Corp. 6, LSD 15, 5-18-2w5, the southern outpost well, finished at 8,650 ft. with Madison at 8,458 ft. is testing the upper lime after two light acid treatments, with intervals on the pipe line to relieve storage congestion. No estimate of potential production has been made. The well has not yet been drilled to the lower lime.

Wartime Oils program.—An extensive government aided drilling program in the west-central area has been announced by Wartime Oils, with the issuing of permits for 10 wells. The most southerly well is Pacific Petroleums 6, LSD 5, 7-19-2w5, now drilling below 3,121 ft.

Under the arrangement, Wartime Oils advances funds to the companies and groups undertaking the drilling, the advances being repayable out of first production. The Alberta government has agreed to defer one-half of its royalties until the advances are repaid. The company is planning to assist drilling in other marginal areas of Turner Valley until the entire field has been drilled out.

Athabaska.—In the Athabaska district, northern Alberta, Deca 2, LSD 3, 16-66-23w4, at 1,687 ft. encountered a heavy gas flow accompanied by a show of oil. The well blew temporarily out of control when the cement plug was drilled out, but later was brought under control. Flow was estimated at 15,000,000 cu. ft. daily, with up to 500 lb. pressure. The oil is a heavy product but it is hoped the gas will flow the well. Cellar has been started for Deca 1, LSD 1, 4-66-22w4. The tests are jointly sponsored by East Crest Oil Co. and Davies Petroleums of Calgary.

CALIFORNIA

Fresno Wildcat Flows Gas but Little Oil

LOS ANGELES, Calif.—Seaboard Oil Co., Union Oil Co., and Tide Water Associated Oil Co. in a joint undertaking may open up a new oil field west of the Raisin City field in Fresno County. The equivalent of the Miocene zone producing in the Raisin City field was cored and given a formation test at 5,002-29 ft. and a second zone in the Eocene was picked up a few days ago. The test of the Miocene section was favorable as fluid reached the surface in 5 minutes and blew the surface connections apart. Gas flow from this interval was estimated at a daily rate of 15,000,000 cu. ft. but there was very little oil present. A test made several days ago from the Eocene interval at 6,235-68 ft. showed a temporary flow of 18,000,000 cu. ft. of gas and a sustained flow of 10,000,000 cu. ft. The formation test was of 29 minutes duration and gas reached the surface in 9 minutes and in 11 minutes there was gas with a spray of oil. On pulling the tester the recovery consisted of 30 ft. of 32-gravity oil. An 1,830-ft. water cushion was used and flow was through a ⅜-in. bottom-hole bean.

The top of the Kreyenhagen was placed in this wildcat, 53-14 S.T.U. in 14-15s-17e, at 5,818 ft. and top of the Eocene was encountered around 6,230 ft. Drilling has been resumed. The wildcat's proximity to the Raisin City field indicates that the productive intervals should be quite similar and not highly productive. The outstanding characteristic of the Raisin City field is a marked lenticularity which is further characterized by outstanding depositional changes.

Fresno County.—Standard Oil Co. of California should complete an excellent flowing well in the Pleasant Valley field when 28-21-F Pleasant Valley Farming Co. is completed within the next few days. This well has over 200 ft. of Gatchell oil sand and on a formation test from about 25 ft. the well flowed at a daily rate of 930 bbl. Standard 28-21-F is lower structurally than other completions to date but should, nevertheless, show substantial production. The most important development in this field in recent days is the location of No. 1-29-F by Standard, 330 ft. south and 330 ft. east of the NW cor. 29-20s-16e, as this location places the well about ½ mile west of No. 62-29-F, a dry hole. Location of this well raises a question as to the interpretation of the seismograph survey of this area. This is further indicated by the fact that Standard moved west of the discovery well for its second well in the field and got a dry hole. For some time after discovery of the field, engineers were of the opinion that the field would extend westward and were surprised when Standard failed to find enough oil sand in No. 62-29-F. The new well, No. 1-29-F, in the NW cor. Section 29, should definitely determine whether No. 62-29-F failed to result in commercial production because of faulting, a feathering out of the sand or a major depositional change. Drilling operations to date have been centered close to the intersections of Sections 20, 21, 28 and 29 and for this reason only about 160 acres have been proved up. R. S. Lytle has moved due north of his first well in Section 20 and completion of this well will extend the limits of the field several hundred feet northward. On the basis of development work to date, contours tend to indicate the presence of the nose of a shore-line deposition extending northwesterly from the NW 28-20s-16e.

New wildcats.—Union Oil Co. which recently abandoned a deep test in the area between the East and West Coalinga fields in Fresno County has moved northeastward and has started another wildcat in 4-20s-15e. The company's original test in this area was in 8-20s-15e, and it was carried down into the Cretaceous and abandoned at a depth of 6,604 ft. The Kettleman sand was cored in this well at 3,326 ft. and the Big Blue was logged at 3,373 ft. Top of the Temblor was placed at 3,640 ft. and the Kreyenhagen was cored at 4,188 ft. with the Eocene at 5,527 ft. A normal column was found but structural conditions were unfavorable. If Union succeeds in finding another shore-line accumulation such as exists at Coalinga Nose, Standard through extensive acreage acquired a number of years ago from Pacific Oil Co. and Shell with extensive fee holdings will benefit most. Standard is starting two new wildcats about 5 miles west of production in the Jacalitos field and both will be drilled at an early date. In 31-21s-15e, the company will drill 2-1 Camino, approximately 330 ft. north and 950 ft. west of the southeast corner of the section. In 30-21s-15e, Standard will drill 1 Wells Fargo approximately 990 ft. south and 1,000 ft. east of the northwest corner of the section. These locations place the wells about 1¾ miles apart in a northwest-southeast direction.

Kern County.—Texas Co. is drilling what may prove to be an important outpost in the Bowerbank gas field and the critical depth should be reached within the next few days. This well, 8-C Bowerbank in 8-29s-24e, is located north of production but south of a dry hole. However, it appears to be slightly higher structurally than previous completions in the field. British-American Oil Producing Co. has cored the Vedder zone of Miocene age in 34-26s-28e, far out on the north flank of the Mount Poso field and a good completion at this point should lead to additional drilling. The Vedder was topped at 1,321 ft. and 32 ft. of oil sand has been cored. Unfortunitely the 8⅝-in. water string froze at 1,311 ft. above the top of the oil sand and had to be cemented at that point. If this results in a good shutoff the test will be made within the next several days.

Coastal District

Ventura County.—Continental Oil Co. has given up the attempt to produce the 7,979-ft. interval in 2 Holser on the Ramona anticline and has resumed drilling operations in the hope of finding another productive zone. To date the result of this work has not been successful although a small well was secured in the initial attempt. Standard's test on Ramona anticline east of Continental's development work to date is not yet deep enough to reach the upper sand which proved productive in the first well but which was missed entirely by the second test. In the Temescal district, Texas Co. has had a few minor showings in 57-1 Dominguez at 5,625 ft. but did not stop for a test. This wildcat is located in 1-4n-18w, and is nearing 6,000 ft. In the Ventura Avenue field, the contractor for Lloyd Corp. has cemented 7-in. casing at 8,059 ft. in well No. 7 and will begin drilling out within the next few days. The derrick over this well toppled over a short while ago and resulted in the death of the derrick man and injury to another. In the Torrey Canyon field which was the scene of considerable drilling during the early life of the California oil industry, Union Oil Co. is spot coring in 60 Torrey, a projected deep test at 3,950 ft.

Los Angeles County.—Standard Oil Co. has decided to call it quits with 5 Sepulveda at 9,268 ft. and has suspended operations. This deep test, located in the San Martinez or western end of the Del Valle field failed to show anything worth testing and apparently indicates the absence of deeper production out on the west flank. Jack Herley and Paul Kelley 1 Orduno which is being watched with considerable interest because of its geographical position on the structure has not yet reached the critical depth although it did find some interesting showings higher up in the hole. This well, if it should be completed as a substantial producer, might prove up some acreage of Kern Oil Co. which is held under lease outside of what now appears to be the limits of production. Completion of 1 Orduno, however, might change the status of this acreage of Kern Oil Co. as the Orduno well is an outpost beyond present production.

WEIGHT INDICATOR POINTS

SERVING THE WAR EFFORT

Hundreds of Martin-Decker Weight Indicators are playing vital wartime roles in the construction, aircraft and marine industries . . . the same weight indicators you are using on your drilling rigs and production hoists. We are proud that the instruments which we have developed in over 18 years of experience and service to the oil industry are now recognized as essential to many other phases of the war effort. You can rely on Martin-Decker Equipment for ruggedness, accuracy and dependability.

MARTIN-DECKER CORP.

LONG BEACH, CALIFORNIA

A. F. McQUISTON, BAKERSFIELD, CALIFORNIA
REED ROLLER BIT CO., HOUSTON, TEXAS

Handle Wire Rope Reels Easier, Faster, Safer!

No. 3 CR Simplex Cable Reel Jack for 51" to 86" diameter reels. 240 sq. inch base area, 17½" lift.

Ideal for field work. A pair of these jacks saves time with safety when new rope is to be payed out or old rope reeled up. Ratchet lever socket speeds operation. One of 7 models of Simplex Cable Reel Jacks.

Ask your field store for Simplex Jacks.

Templeton, Kenly & Co., Chicago (11)

Better, Safer Oil Field Jacks Since 1899

Simplex LEVER · SCREW · HYDRAULIC Jacks

Among the Drilling Contractors

Cron & Gracey Drilling Corp., Houston, Tex., is moving in to drill 12 Pelican for Shell Oil Co., Inc., in the Gibson field, Terrebonne Parish, Louisiana. It recently completed 14-B Realty Operators in that field for the same company. Cron & Gracey will deepen 8 O. H. Castle, north of Lake Charles, in Calcasieu Parish, Louisiana, for Fohs Oil Co.

Harry L. Edwards Drilling Co., Houston, Tex., has completed 1 Heyne, in the North La Ward field, Jackson County, Texas, for Cities Service Oil Co. and is moving the rig to 4 Graves in that field, which it will drill for Cities Service. This contractor set surface pipe last week for 1 Oehl, which is to be drilled for Maco Stewart in North La Ward. Edwards is below 8,200 ft. at Pan American Production Co. 2 Peters, in the South Gillock area, between Texas City and Dickinson, in Galveston County, Texas. Contract depth is 10,500 ft.

Rowan Drilling Co., Houston, Tex., is building derrick for 1-D State-Trinity Bay, which it has contracted to drill for Standard Oil Co. of Texas in the South Anahuac area of Chambers County, Texas. It was coring at 9,000 ft. last week at 1 Julia Hinz, which it is drilling for Gulf Oil Corp. on the Esperson dome, Liberty County. Rowan has staked location for 1 L. B. Broussard, a wildcat test which it will drill for its own account 4½ miles southeast of Fannett, in Jefferson County.

Golding-Farris Drilling Co., Houston, Tex., was rigging up last week to deepen 1 Cavacos, 12 miles southeast of Edinburg, Hidalgo County, Texas, to 9,500 ft. for Gulf States Oil Co. Original depth was 8,000 ft. It was completing as a producer 1 Maryetta Mays, drilled for R. J. Ursillo and Lombardo Brothers in Chambers County. Total depth was 6,600 ft.

Housh & Thompson Drilling Co., Houston, Tex., is rigging up for two wells to be drilled in the Katy field, Harris County, Texas. One is 1 Alexander, for Humble Oil & Refining Co. and the other is 1 Morrow, for J. B. Hawley. Housh & Thompson has the contract to drill 117 Phoenix, for Gulf Oil Corp. in the Hull field, Liberty County. It was moving in last week at 1 Hirsch estate, to be drilled for William Helis, 7½ miles southeast of Devers, in Liberty County.

Goldrus Drilling Co., Houston, Tex., was doing a squeeze job at 7,515 ft. last week at Mackhank Petroleum Co. 1-W Freeland, 3 miles west of Pettus, in the Cosden (Wilcox) field, Bee County, Texas. Whether the test would prove a commercial producer has not been determined.

J. W. Lang, Inc., has been awarded contract to drill J. W. Lang, Inc., and Michigan Development Petroleum Co. 1 Dozeman-Schaap, in SE SW NE 11-4n-15w, Allegan County, Michigan.

Robert W. Atha will drill Gulf Refining Co. 2 Herman Blohm, in C S½ SE SW 28-15n-4e, Bay County, Michigan.

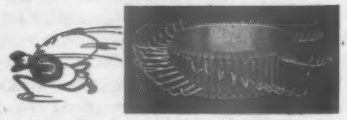
Two States Drilling Co. will drill Ohio Oil Co. 1 Roy E. Lawrence, in C E½ NE NE 7-28n-8w, Kalkaska County, Michigan.

Muskegon Development Co. has the contract to drill Gulf Refining Co. 2 Caroline Prevost, in C N½ NW NE 11-14n-4e, Bay County, Michigan. Contractor will also drill E. L. Bour-

Don't Let Cementing Failures ROB YOU OF PROFITS!

Use B and W, Inc.

WALL CLEANING GUIDES



"The Bronze-Finished Scratcher with the Torque Springs"

B and W, Inc.

BRUCE BARKIS · KENNETH WRIGHT

Well Completion Specialists

WEST COAST: 3545 Cedar Avenue
Long Beach, Calif. Phone: L.B. 4-8366

GULF COAST: 1105 Commerce Bldg.
Houston, Texas. Phone: Preston 9781

ret 1 Sage Ver Hoeven and Herman S. Walters (Comm.) in C SE SW 36-5n-15w, Ottawa County, Michigan.

Ashby Drilling Co. has been awarded contract to drill Cities Service Oil Co. 1 Harold Fetterle, in C E½ SW SW 9-14n-11w, Newaygo County, Michigan.

Leonard Drilling Co. will drill Rawmor Corp. 1 fee, in C S½ SE SW 16-24n-2w, Roscommon County, Michigan.

R. M. Perry has the contract to drill Socony-Vacuum Oil Co., Inc., 1 A. Smith and B. Bobczynski (Comm.), in SW SE SE 24-1s-16w, Van Buren County, Michigan.

E. V. Hilliard has the contract to drill Cherokee Oil Co. and Felix J. Boadway 1 A. Wood, C S½ SW NW 19-22n-9w, Wexford County, Michigan.

Turner Drilling Co. has been awarded contract to drill the cable-tool portion of Hassie Hunt, trustee 1 Laslo Zaylor, in C W½ SE NW 30-22n-10w, Wexford County, Michigan. **C. W. Teeter** will drill the rotary contract.

Wheless Drilling Co., Shreveport, La., has the contract on a deep Harrison County, Texas, test Siosi Co. will drill 2 miles northwest of Jonesville. The test is the 1 T. C. Lindsey, in the Daniel Grouse Survey on an 844.10-acre tract. Work is to start August 5.

Big Chief Drilling Co., of Oklahoma City, Okla., and George Dickey, of Wichita, Kans., last week announced location for a wildcat test to the Wilcox sand, in C NW SW 33-21n-6e, near Maramec, in Pawnee County, Oklahoma. The pay is expected around 3,400 ft. Location is on a 720-acre lease block.

Noble Drilling Co. has been awarded the contract on California Co. 1 F. D. Brown, in 4-9n-10e, the Lake St. John area, Concordia Parish, Louisiana. The test has already spudded.

Bureau of Mines Expands Coal-Hydrogenation Work

WASHINGTON, D. C.—Testing millions of tons of coal for the Army, seeking substitute fuels to replace those in which shortages exist, promoting the production of high-quality coke to feed the wartime blast furnaces, advising on storage and combustion problems, and producing gasoline and oil from coal are in the Bureau of Mines' expanded fuel-testing program for the 1944 fiscal year, Secretary of the Interior Harold L. Ickes announced last week.

Continuance of these and other essential allied activities has been made possible through a congressional appropriation of $375,000, Secretary Ickes stated in stressing the importance of fuels as basic raw materials in the wartime economy.

A Bureau of Mines project holding perhaps the greatest current interest is the hydrogenation of coal and water gas to produce liquid motor fuel and fuel oil. The demands of the war and the lack of adequate transportation facilities, causing critical shortages of petroleum products in certain sections of the United States, have focused public attention on the diminishing discoveries of new oil fields. Secretary Ickes, who also is petroleum administrator for war, said recently that it is necessary "to develop, on a commercial basis, known methods of making liquid fuel from coal, lignite, or oil shale" to insure adequate supplies of future use.

Coal reserves of the nation are virtually unlimited, and the objective of the bureau's work is to determine which coals and which methods are the best suited for producing liquid fuels. One small laboratory-scale pilot plant for the direct hydrogenation of coal by the Bergius method is in operation, and the bureau is ready to install and operate an industrial-scale pilot plant if funds are provided. Another small laboratory-scale plant which will synthesize oil by combining carbon monoxide and hydrogen by the Fischer-Tropsch process is under construction at the bureau's Pittsburgh experiment station. Research in this plant will provide the technical information needed for designing and constructing an industrial-scale pilot plant which will furnish the blueprint for commercial plants.

INSURANCE
(By the Gallon, Quart or Pint)
AGAINST THREAD LEAKS
RECTORSEAL forms a soft, pliable mass, preventing thread leaks even against high pressure. Lubricates threads to extent of permitting full thread engagement and easy dismantling. Insoluble in all petroleum products. Ready for use as furnished. Seal lasts indefinitely. Available in various container sizes to fit your needs, at your supply dealer. Proved by years of hardest oil field service. A product of Rector Well Equipment Company, Fort Worth, Texas.
RECTORSEAL

H. C. SMITH
ROCK BITS
Speed up the "hole job" and keep costs down

H C Smith Oil Tool Co.
GENERAL OFFICES AND PLANT
P. O. BOX 431 Compton, Calif.
Export Representative: Val R. Wittich
30 Rockefeller Plaza, New York City

PERSONALS

C. D. BROWN

Sohio's Secretary's Promotion Follows 24 Years' Service

CALVIN D. BROWN, who recently was appointed secretary of Standard Oil Co. (Ohio), joined the company in 1919 following his discharge from the Army, in which he served as an officer with the A.E.F. in the first World War. He first went with the Toledo refinery, which was just being constructed at that time. It was not long before he had risen to chief clerk, and in 1929, just 10 years after he had joined the company, he was appointed assistant superintendent of the refinery.

In 1940 he went to the home office in Cleveland, and in the same year was made assistant secretary and treasurer of the company.

Since October 1939, when Frank Kelly, former secretary, retired, W. J. Semple has performed the duties of both secretary and treasurer. Increasing duties of both offices made it advisable that they be divided, and 2½ months ago Mr. Semple relinquished the duties of secretary to Mr. Brown.

Mr. Brown is married and has two children, a son, 20 years old, who is an aviation cadet in training in Mississippi, and a daughter, 8 years old. He is of a quiet and retiring demeanor.

George D. McIntyre, a veteran of 27 years' service with Standard of Ohio, was promoted to assistant secretary. Previously he had charge of industrial and personal-property claims. When Standard of Ohio acquired Refiners, Inc., in 1931, he served as vice president of that subsidiary until its liquidation.

Fred M. Ziegler, Kern Oil Co., was elected first vice president of the Conservation Committee of California Oil Producers, and **J. L. Stevens** of Chanslor-Canfield Midway Oil Co., was elected second vice president at the recent election which was state wide in scope. **Henry Power,** General Petroleum Corp., was elected secretary.

H. E. Ammerman, assistant to **L. E. Sauer,** vice president of Republic Oil Refining Co., Houston, Tex., lists himself among sufferers in the $10,000,000 damage inflicted by the coastal hurricane last week. Chicken raising is his hobby. Loss: 24 White Rocks. The birds were in a large brooder, and not one survived the storm.

C. F. Wilson and **W. H. Ford,** landmen; **Ed Gartman,** production superintendent, and **Hal Bybee,** geologist, comprise the personnel of a new field office Carter Oil Co. has opened at Henderson, Ky.

R. S. Hendrix, chief clerk in the Lovell Lake district, Jefferson County, Texas, for Humble Oil & Refining Co., and **L. E. Odom,** chief clerk in the Hardin district, Liberty County, have exchanged posts.

Capt. R. A. Wolfe, Jr., petroleum engineer, of Houston, Tex., has arrived with the 392nd Engineer Regiment in England. Captain Wolfe went into military service in June 1941. His father is president of Vireca Corp., vice president and general manager of Refugio Oil Corp., and has extensive oil-producing interests personally.

Harold E. Radford, field engineer at Long Beach, Calif., for Shell Oil Co., Inc., in its Los Angeles Basin division, has been made a field engineer at Marysville, Calif., Sacramento area.

Frank E. Holsten, executive vice president and general manager of Chalmette Petroleum Corp., New Orleans, La., was reelected president of the Gulf Coast Refiners Association at its annual meeting in Houston, Tex., last week. Mr. Holsten will continue to represent this organization of independent refiners on the PIWC and to serve as a member of the PAW District 3 refining committee. **John A. Bartlett,** vice president, American Mineral Spirits Co., Corpus Christi, Tex., and **George O. Irvine,** vice president, American Republics Corp., Houston, were reelected vice presidents of the association. **L. F. Rothermel,** president, Maritime Oil Co., Houston, was reelected treasurer. **George Reid** will continue to serve as executive secretary.

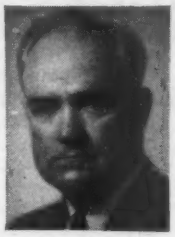
James Tanham, New York, vice president of the Texas Co., has been appointed an alternate industry member of the National War Labor Board. He has served as a panel member representing industry in many board cases. He represented industry on the panel gathering testimony from steel companies which were requested by the board to show cause why they should not comply with the provisions of the board's big-steel decision. He has been employed by Texas Co. for 25 years starting as a stenographer. In 1926 he was made assistant to the vice president and in 1933 became assistant to the president. He has been a vice president of the company since September 1941.

Paul Pigott, of Seattle, president of the Pacific Car & Foundry Co., and prominent in business and industry in the State of Washington, last week was elected a director of the Standard Oil Co. of California, at a meeting of the board of directors in San Francisco.

R. L. Davis, of Texas Co., has been appointed production foreman at Huntington Beach, Calif., succeeding **R. L. Jackson,** who has been transferred to Fellows in the San Joaquin Valley.

Fritz Karge, who was a member of the pipe-line department of Union Oil Co. for a number of years and who has been employed as engineer for the past year by Fluor Co., has

returned to Union Oil Co. as pipeline engineer.



E. E. Townes, vice president and general counsel for Humble Oil & Refining Co., Houston, Tex., will retire September 10 at the age of 65. The men who organized the company in 1917 were clients of Mr. Townes. He was made head of the legal department and has held that post ever since. He wrote the company's charter and its retirement plan.

Karel L. Hagemans, an engineer at the Pacific Coast head office of Shell Oil Co., Inc., in San Francisco, has been transferred to engineering duties at the company's Wilmington refinery.

N. Harris has been transferred from Osage County to Oklahoma City, Okla., as superintendent of Mid-Continent Petroleum Corp., while **Bill Wingo** has been transferred from Oklahoma City to the Seminole district.

Robert Seares, clerk, has been promoted to assistant department manager of the Wilmington, Calif., refinery by Shell Oil Co., Inc.

George H. Cord, formerly division engineer for Stanolind Oil & Gas Co., has been promoted to district superintendent of the East Texas and North Texas districts. He has been succeeded by **S. F. Peterson,** formerly petroleum engineer of the Tulsa office. **C. B. Carruthers,** petroleum engineer at Fort Worth, has been transferred to Tulsa. **Lewis Finch, Jr.,** proration engineer at Fort Worth, has been transferred to Odessa, Tex., as field engineer for North Cowden pool, replacing **Whitney Elias,** who was transferred to Tulsa. **J. M. McCrea,** district superintendent of East and North Texas, has been promoted to the public relations division at Fort Worth.

Lee S. Osborne, exploitation engineer in Shell Oil Co., Inc.'s coastal division, has been transferred to Marysville, Calif., as field engineer in the Sacramento area. He is succeeded by **John B. Sansome,** formerly exploitation engineer in the Los Angeles office. **Harvey F. Danberg,** exploitation engineer in the San Joaquin division, has been transferred to the Los Angeles office.

A. E. Brewer, assistant to chief clerk in the Wichita Falls, Tex., office of Shell Oil Co., Inc., has been transferred to Lucien, Okla. Other Shell changes take **Harry Bridges,** North Texas division junior production engineer to Centralia, Ill., to be succeeded by **Kenneth Schluntz,** who goes to Wichita Falls from Wichita, Kans.; **R. L. Trapp,** of the district engineer's office, to division engineer's office, at Wichita Falls, and **C. C. Ashbrunner,** of the district engineer's office at Bristow, Okla., to the district engineer's office at Wichita Falls, replacing Mr. Trapp.

Harrison Keith, drilling foreman at Dominguez, Calif., Los Angeles Basin division, for Shell Oil Co., Inc., has been transferred to Ventura, Calif., in the coastal division, without change in title or duties.

James B. Dunn, president, and **E. B. Reeser,** retiring president, of the Barnsdall Oil Co., were guests of honor at a party given by **D. R. Snow,** vice president of the company, Monday evening, August 2, Tulsa. Prominent oil men and business men of the Mid-Continent area were present. Mr. Reeser, who retired from active duty with the Barnsdall organization August 1 after 50 years in the oil business, was honored at a dinner given by the management and by employes at the Mayo Hotel, Tulsa, July 29.

Sherman L. Pease, exploitation engineer, Los Angeles Basin division for Shell Oil Co., Inc., has been transferred to the San Joaquin division.

A. M. Joncas, president of Glenora Oil Co., Houston, Tex., is one of several persons in that city whose homes were struck by lightning last week. The bolt that hit Mr. Joncas' residence in Ella Lee Lane knocked down a chandelier, shattered plaster and inflicted other damage, aggregating several hundred dollars.

Walter M. Cheney, drilling foreman at the Los Angeles, Calif., office of Shell Oil Co., Inc., has been transferred to the San Joaquin division at Bakersfield, Calif., where he has the same title.

Cecil Morgan, Baton Rouge, La., became general counsel for Standard Oil Co. of Louisiana August 1, succeeding **T. M. Milling** who retired as head of the legal department, vice president and director of the company.

E. A. Brown has been appointed general superintendent for Ashland Oil & Refining Co., Ashland, Ky., succeeding Boyd Morgan who was fatally burned in a plant accident several weeks ago.

Benjamin Miller, engineer, has left Gas Advisers, Inc., affiliated with Cities Service Co., to join the Institute of Gas Technology, Chicago.

ORBIT VALVES

THE VALVES THAT CAN "TAKE IT"

Orbit Master Valve

ORBIT MASTER VALVE

The Orbit Master Valve is quick opening—has easy operation and a positive shut-off. A welded bonnet valve—insurance against possible gasket leaks.

YOUR ORBIT VALVES will last for the duration. Meanwhile, if you have any questions regarding their care or maintenance, write us.

OIL WELL IMPROVEMENTS CO.

Since 1912

TULSA, OKLAHOMA

Market Developments

East Coast

NEW YORK. — The reduction in tank-car capacity resulting from the shifting of many tank cars from Norris City, Ill., to Gulf Coast sources of supply has been much less than expected with the result that the improvement in the East Coast supply situation has continued though less rapidly than in the first 5 weeks of the current rise. The upward trend in the East Coast supply index has continued through 2 full months with more rapid improvement expected when the big-inch line reaches capacity.

With the Norris City-East Coast leg of the line now taking 100,000 bbl. daily while testing is progressing, tank cars are still taking the remaining volume of crude carried in the line from Texas to Norris City. This volume was increased almost 10 per cent last Wednesday when the repairs to the Arkansas River crossing were completed and the first section of the line was returned to full capacity.

The belief is held in some quarters that the ban on pleasure driving will not be lifted before the full effect of the big-inch is felt. Since some of the stations on the eastern leg of the line have not yet been completed, it is possible that this will not be before September 1. On the other hand PAW is reported to have been committed to an earlier deadline in accordance with wishes of OPA and restrictions may be lifted by mid-August.

In view of the trouble that followed the relaxing of the first pleasure-driving ban, such action at this stage still seems premature. Total stocks on the East Coast available for civilian consumption are still well below levels of a year ago and unless they are adequately augmented in the next couple of months, even record shipments that are expected will not be sufficient to prevent completely the possibility of local shortages.

Mid-Continent

SUPPLIES of motor fuel and most burning oils in the Mid-Continent refining district this week continued to lag behind demand as reflected by unsatisfied inquiries from purchasers. Numerous refiners were entirely withdrawn from the spot market and most other manufacturers were in position to quote on only small percentages of the total potential business.

Meanwhile, District 2 refiners prepared to adjust operations in order to recover the maximum volume of heating oil in line with instructions from the Petroleum Administration for War. The PAW Refining Division early this week authorized several District 2 refiners with plants adjacent to the Great Lakes to increase their crude runs to the maximum in order to intensify production of heating oils, provided the greater output is earmarked exclusively for shipment to the East Coast.

Refiners were still under strong pressure from buyers to increase shipments of automotive gasoline into agricultural districts where harvesting and marketing operations are beginning to raise consumption even above the planting-season levels.

Gulf Coast

HOUSTON, Tex. — Intensifying a scarcity of refinery products already acute, the hurricane which swept parts of coastal Texas last week damaged many plants, necessitating shutdowns of varying length. Two cooling towers at the Baytown plant of Humble Oil & Refining Co. were blown down. Southport Petroleum Co.'s plant at Texas City was under water and shut down. Damage at the plant of Pan American Refining Corp. at Texas City had not been fully estimated late last week. Three cooling towers at the plant of Republic Oil Refining Co., Texas City, were down, and it was believed operation could not be resumed for 3 weeks. Surveys of damage inflicted at the plants of Sinclair Refining and Shell Oil Co., Inc., on the Ship Channel, Houston, had not been completed.

Gasoline continued to be the material most urgently sought. The quantity of regular and premium grades available for shipment outside District 3 was reported to be negligible. Local demand was absorbing practically all that could be bought. Refineries with facilities for making aviation grades were being urged by PAW officials to increase their output of 87 and 91-octane motor fuel.

Demand for natural gasoline far outstripped the available supply. With their inventories of naphtha increasing, refiners in the Corpus Christi area have been clamoring for natural with a view to using it for blending purposes.

Pacific Coast

LOS ANGELES, Calif. — California refined-oil markets were quiet during the past week, there being very little movement and negligible sales. Fuel-oil demand continued high but those refiners having stocks were asking $1.10 per barrel with no buyers at that price. This group appears to realize that present prices are too low and when fuel-oil stocks are further reduced expect to be in a position to take advantage of better prices. Then, too, there is the possibility that crude oil and fuel-oil prices might be increased to stimulate wildcat exploration and increase production in oil fields. There is not much fuel oil in the hands of the independent refiners.

Gasoline sales have shown an improvement in the retail field and this is being reflected by increased sales of refiners. The number of stations that have been suspended is also showing an improved condition, with an increasing number opening up again. It is interesting to note that a definite relationship exists between the number of stations resuming operation and the improvement being registered in retail sales. June gasoline sales were 9.18 per cent below sales during June of last year which month also reflected rationing and current sales were also approximately 16 per cent below sales during the month of June 1941. Gas-oil stocks continue in good demand but there is very little moving as refiners consider this commodity a blending stock for fuel oil.

A.P.I. REFINERY REPORT

(Figures in thousands of barrels)

Week Ended July 24, 1943

	Dly. crude runs to stills	Stocks: Gasoline	Stocks: Residual	Stocks: Gas oil
Appalachian	143	2,159	599	1,056
Ind., Ill., Ky.	753	15,051	3,270	5,623
Okla., Kan., Mo.	348	6,287	1,693	2,026
Censored area*	1,888	30,904	14,162	15,122
Rockies	86	1,733	659	355
California	745	19,600	48,699	11,707
Total 7-24-43	3,973	75,714	66,992	35,889
Total 7-17-43	3,962	76,565	67,017	35,036
Total 7-25-42	3,640	80,762	77,512	36,048

*Reports combined on East Coast, Texas Gulf, Louisiana-Arkansas and Inland Texas at request of PAW.

CRUDE-OIL STOCKS

(Bureau of Mines Estimate)

Week ended:	Bbl. of crude*
July 24, 1943	237,279,000
July 17, 1943	237,440,000
July 25, 1942	249,282,000

*Excludes heavy, unrefinable stocks in California.

Refinery Prices

(Prices as of August 3)

Quotations are f.o.b plant in cars and in cents per gallon except where otherwise noted. They are exclusive of the federal excise taxes of 1.5 cents a gallon on gasoline and 4.5 cents a gallon on lubricating oils, and do not include marine lighterage charges.

REFINERY GASOLINE

Octane (A.S.T.M.):	†80	74-76	72-74	68-70	63-66
Mid-Continent*	.....	.....	5.875-6.000	.....	5.500-5.625
Pennsylvania	.....	6.750-7.000	.....	.....	.....
Gulf Coast	6.00-6.50	.....	$5.750-6.250	$5.750-6.250	$5.250-5.750
Northeast Coast	9.80	.....	9.2	9.2	.....
California	.....	6.125-6.500	6.000-6.125	5.500-6.000	5.000-5.250

*Basis Group 3. †1939 C.F.R. (research method). ‡Unleaded.

KEROSENE AND NO. 1 FUEL OIL

Gravity:	46	45	42-44	41-43	38-40
Mid-Continent*	.....	.....	4.500	4.375	.....
North Louisiana	.....	.....	.....	4.500-4.750	.....
Pennsylvania	6.250-6.625	6.125-6.250	.....	.....	.....
California	.....	.....	.....	4.500-5.500	4.250
Northeast Coast	.....	.....	.....	6.80	.....
Gulf Coast	.....	.....	.....	4.125	.....

*Basis Oklahoma Group 3.

TRACTOR, DIESEL, AND BUNKER FUEL OIL

Specifications:	46-48° G.	24 D.I.	48-52 D.I.	58 & above	Diesel bunkers	Residual Bunker C‖
Mid-Continent*	4.125	.....	.....	.....	.....	$0.80-1.27
California	.....	2.750-4.000	.....	.....	‡1.35-1.45	0.85-1.00
Gulf Coast	.....	.....	4.000	4.125	1.45	0.85-1.27
Northeast Coast	.....	.....	.....	6.800	2.780	1.65-2.07
North Louisiana	.....	.....	.....	.....	.....	0.80-1.27

*Basis Oklahoma Group 3. †10-14° gravity. ‡Pacific Specification 200. ‖Gravity range.

FURNACE OIL, GAS OIL, FUEL OIL

	No. 2	No. 3	No. 5	No. 6
Mid Continent*	3.625-3.750	3.500-3.625	$0.85	$0.80
Pennsylvania (West)	5.875-6.125	5.875-6.000	†5.250-5.500	.....
Northeast Coast	6.7	6.7	1.95	1.65
California	5.5	5.5	‡1.10-1.25	‖1.10-1.15
Gulf Coast	3.875-4.0	.....	1.65	0.85

*Basis Oklahoma Group 3 †36-40 gravity fuel. ‡Pacific Specification 300. ‖Pacific Specification 400.

NATURAL GASOLINE

Grades:	26-70	18-55
Oklahoma (Group 3)	3.875	4.638
North Texas	3.500	4.200
North Louisiana	3.625	4.350
California	4.875	5.500

LUBRICATING OILS

Bright and Steam Refined

OKLAHOMA (Group 3)—

200-210 D, 10-25		27.00
150-160 D, 0-10		23.00
120-125 D, 0-10		22.00
Steam refined:		
600 dark green (untreated)	9.00	9.50

PENNSYLVANIA—

Bright Stocks (Pennsylvania Grade No. 8 color, 140-150 at 210, 545-550 flash)

10 pour point		30.50
15 pour point		29.50
25 pour point	25.00	28.00
Steam refined:		
600	15.00	16.00
650	15.50	16.50
600 flash	16.00	17.50
650 flash	17.00	17.50

Neutral Oil

(Vis. at 100° F. except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—

0-10 pour point:

300-3	15.00
400-3	18.00
500-3	19.50
600-3	20.00

Note: Viscous neutrals, 10-25 pour, quoted 0.5 cent under 0-10 oils.

Neutral Oils

CALIFORNIA—

Pale oils:

200-2½-3	7.00	7.75
400-3-4	7.25	8.00
600-3-4	8.75	11.00

Red oils:

200-4-5	7.00	7.75
400-5-6	9.00	11.00
500-900, 5-6½	9.25	11.25

GULF COAST—

Pale oils:

200-3	8.50	8.75
300-3	9.00	9.25
500-3½	9.75	10.00
750-3½	10.00	10.25
2,000-4	10.50	10.75
3,000-4	12.25	12.50

PENNSYLVANIA—

150 vis. at 70° F., 3 color, 400-405 flash:

Zero pour point	37.50
10 pour point	36.50
15 pour point	35.50
25 pour point	30.00

200 vis. at 70° F., 3 color:

Zero pour point	39.50
10 pour point	38.50
15 pour point	37.50
25 pour point	32.00

WAX

(Cents per pound)

OKLAHOMA (Group 3)—	
124-126 (A.m.p.) w.c. scale	4.250
PENNSYLVANIA (inland refineries)—	
122-124 (A.m.p.) w.c. scale	4.250
124-126 (A.m.p.) w.c. scale	4.250
NEW YORK—	
Wax in bags fully refined:	
130-132 (A.m.p.) wax	5.850
133-135 (A.m.p.) wax	6.150
Crude scale:	
124-126 (A.m.p.) w.s.	4.250
124-126 (A.m.p.) y.s.	4.250

TANK-WAGON PRICES IN 50 CITIES

(Gasoline prices based on regular grades, tax included, undivided dealer)

ATLANTIC AND NEW ENGLAND
(Socony-Vacuum Oil Co., Inc., and Atlantic Refining Co.)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Baltimore, Md.	15.96	5.50	10.50
Boston, Mass.	14.96	4.50	10.10
Burlington, Vt.	16.90	5.50	10.20
Buffalo, N. Y.	16.20	5.50	10.90
Dover, Del.	16.70	5.50	12.20
Hartford, Conn.	15.66	4.50	10.00
Manchester, N. H.	17.30	5.50	12.10
Newark, N. J.	15.20	4.50	10.00
New York, N. Y.	16.10	5.50	10.10
Philadelphia, Pa.	16.20	5.50	11.95
Pittsburgh, Pa.	16.70	5.50	12.20
Portland, Me.	16.30	5.50	10.20
Providence, R. I.	15.00	4.50	9.90
Washington, D. C.	15.20	4.50	11.25
Average 14 cities	16.02	5.14	10.86

(All prices undivided dealer basis.)

CENTRAL

(Standard Oil Co. of Indiana, Standard Oil Co. of Ohio, Continental Oil Co. and Texas Co.)

	Dealer tank wagon	Combined tax	Kero tank wag.
Chicago, Ill.	13.40	4.50	10.20
Cleveland, Ohio	15.00	5.50	*9.00
Dallas, Tex.	13.00	5.50	7.00
Des Moines, Iowa	14.40	4.50	9.80
Detroit, Mich.	14.40	4.50	9.00
Fargo, N. D.	16.90	5.50	11.20
Huron, S. D.	16.30	5.50	10.70
Indianapolis, Ind.	15.20	5.50	9.00
Little Rock, Ark.	17.50	6.00	10.00
Milwaukee, Wis.	16.10	5.50	10.50
Minneapolis, Minn.	15.40	5.50	10.20
Omaha, Neb.	15.40	6.50	9.80
Tulsa, Okla.	16.50	7.00	8.50
Wichita, Kans.	13.70	4.50	8.00
Average 14 cities	15.15	5.57	9.61

*Includes 1-cent state tax.

SOUTHEASTERN

(Standard Oil Companies of New Jersey, Kentucky, and Louisiana)

	Dealer tank wagon	Combined tax	Kero tank wag.
Atlanta, Ga.	18.90	7.50	*11.30
Birmingham, Ala.	18.50	8.50	9.00
Charleston, S. C.	18.95	7.50	....
Charleston, W. Va.	19.25	6.50	13.30
Charlotte, N. C.	20.10	7.50	11.30
Jacksonville, Fla.	18.90	8.50	9.80
Jackson, Miss.	17.50	7.50	†9.00
Louisville, Ky.	16.50	6.50	8.50
Memphis, Tenn.	17.90	8.50	10.80
New Orleans, La.	17.75	8.50	*10.00
Norfolk, Va.	17.45	6.50	12.30
Average 11 cities	18.34	7.50	10.40

*Includes 1-cent state tax.
†Includes ½-cent state tax.

MIDWESTERN
(Continental Oil Co.)

	Dealer tank wagon	Combined tax	Kero tank wag.
Albuquerque, N. M.	17.50	7.50	10.00
Boise, Idaho	20.10	6.50	16.50
Casper, Wyo.	17.00	5.50	12.00
Denver, Colo.	14.50	5.50	11.00
Helena, Mont.	17.00	6.50	13.00
Phoenix, Ariz.	18.50	6.50	12.50
Reno, Nev.	17.50	5.50	13.50
Salt Lake, Utah	18.50	6.50	14.50
Average 8 cities	17.56	6.25	12.88

PACIFIC COAST
(Standard Oil Co. of California)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Portland, Ore.	17.00	6.50	13.30
San Francisco, Calif.	14.50	4.50	11.50
Seattle, Wash.	17.00	6.50	13.80
Average 3 cities	16.17	5.83	13.03
Average 50 cities	16.55	5.96	10.67

Equipment Progress

New 100 Per Cent Flow Filter-Clarifier

An oil filter which is said to combine the advantages of 100 per cent flow and bypass or shunt-type filters,

is a new product of Briggs Clarifier Co., Washington, D. C.

The filter section is equipped with long-fibered cellulose cartridges and is designed to take the complete flow of the system thus removing all solid contamination. The clarifier section is designed with sufficient capacity to continuously maintain the oil free of oxidation products and may be operated at will.

The application of this Filter-Clarifier is universal. It is available in sizes ranging from 5 to 200 g.p.m.

Oil Well's Mexican Subsidiary Discontinued

Oil Well Supply Co. has announced that its subsidiary in Mexico, Cia. Consolidada Oilwell S.A., has sold its properties and discontinued operations. Gilbert M. Davies, manager of the latter company for several years, will represent Oil Well Supply Co. in Mexico.

Second Army-Navy Award

Builders Iron Foundry (Builders-Providence, Inc.), Providence, R. I., "has won for the second time the Army and Navy production award for meritorious services on the production front."

Two New Stoody Hard-Facing Alloys

Stoody Co., Whittier, Calif., announces Stoody 1 and Stoody 6, two new hard-facing alloys of cobalt, chromium and tungsten. Both are furnished as welding rods for application by the oxyacetylene process. Stoody 1, the harder of the two alloys, provides high resistance to abrasion, corrosion and heat. It is specially recommended for hard-facing pump sleeves, wood saw teeth, carbon scrapers, wire guides, expeller parts, and similar types of equipment.

Stoody 6 is not quite so hard as Stoody 1, but is much more ductile

and provides much greater resistance to impact. It is especially useful for hard-facing high-pressure, high-temperature valves, gasoline and diesel exhaust valves, various types of dies, shear blades, cams, etc.

Among Equipment Men

O'Connor Now Associated With E. L. Carter

D. T. O'CONNOR

D. T. O'Connor, formerly with Lago Petroleum Corp., Maracaibo, Venezuela; Bahrein Petroleum Co., Bahrein Island, and more recently with Trinidad Leaseholds, Ltd., Trinidad British West Indies, is now associated with E. L. Carter, export manager for Shaffer Tool Works, W. C. Norris, Mfr., Inc., Wheatley Bros. Pump & Valve Co., Tom Wheatley Co. and American Machinery Corp.

Whyte Heads Casting Sales For Cooper-Bessemer

Dave M. Whyte, foundry expert of Cooper - Bessemer Corp., has been appointed supervisor in charge of casting sales of the corporation's two foundries, one at their Mount Vernon, Ohio, headquarters and the other at Grove City, Pa. Mr. Whyte, who has been with Cooper-Bessemer for the past 20 years, is well known throughout the industry for his valuable contributions to the development of new foundry methods and techniques.

Prior to his present appointment, he served the company as assistant foundry superintendent, superintendent of the Mount Vernon foundry, and superintendent of the Grove City foundry.

Brandt Named Vice President Elliott Co.

The board of directors of Elliott Co., Jeannette, Pa., announces the election of Edgar C. Brandt as a member of the board and as vice president in charge of manufacturing. Mr. Brandt comes to the company after 38 years of experience with Westinghouse Electric & Manufacturing Co. He has also served the War Production Board for the past 2 years, 1 year in Washington in the equipment and production division, and 1 year as manager of the machine tool and equipment division in Detroit during the critical conversion of automotive industries to war production.

Classified Advertising

EQUIPMENT FOR SALE

1—500 HP Terry condensing turbine—1750 RPM.
1—700 HP Terry condensing turbine—2900 RPM.
1—100 HP Superior twin gas engine compressor.
1—I. Rand 14/7 x 14 Type XRB compressor with 150 HP motor, all on steel skids.
2—I. Rand type XPVR 1800 ft. compressors—steam driven.
4—4" Pacific 10 stage centrifugals—500 GPM-750#.
1—600" x 34' Southwestern flash column.
1—750 sq. ft. Southwestern condenser, steel shell, admiralty tubes.
1—670 sq. ft. Braun 6 pass, 250# atmospheric section.
1—40 sq. ft. G. Rusell shell and tube condenser, 800# WP.
2—14 x 12 I.R. cylinders XRB.
2—14 x 14 I.R. cylinders XRB.

DAVE WEST COMPANY
2301 East 37th St., Los Angeles, Calif.

WELDING RODS

Good supply mild steel, reverse or straight polarity and AC, available immediate delivery. Excellent deliveries on stainless steel electrodes and 4-6% Chrome and Alloy Electrodes.

WELDING MACHINES

New; Used. Gasoline Operated and Electric Driven DC Machines and AC Transformers Types. PETROLEUM EQUIPMENT SALES CO., 910 Clay Ave., Houston (1), Texas.

1 Carbondale Wax Press, 250 plates, 48" diameter, ½" ring.
1 Complete (less refrigeration) Sharples Centrifuge Bright Stock Dewaxing Plant, which includes four inclosed type Sharples Centrifuges; two 1,000-barrel Carbondale Chilling Tanks; one 1,000-barrel Mixing Tank. Also miscellaneous Accumulator Tanks and all necessary Centrifugal Brine and Water Circulating and Transfer Pumps, all in excellent condition.
1 150 HP, 125 P.S.I., H.R.T. Titusville Iron Works Boiler, equipped with Iron Fireman.
3 150 HP, 125 P.S.I., H.R.T. Titusville Iron Works Boiler, no stokers. All Boilers will pass Pennsylvania inspection.
1 Columbus Conveyor Company Coal Lift and Conveyor.
3 1,500-barrel 30' diameter x 12' high wood roof storage tanks.
2 750-barrel 30' diameter x 6' high wood roof Kerosene Bleaching Tanks.
1 G.E. (AC) 57 K.V.A. Electric Generator, direct connected to 85 HP Cooper-Bessemer Oil Engine. Also panel board and air starting unit.
13 5-ton pressure Oil Filters.
14 2½-ton pressure Oil Filters.
2 7" x 8" Triplex Pumps with motors.
1 Small Machine Lathe, suitable for light work.
1 Agitator, 300-barrel capacity, not lined.

Material located at Oil Creek Refining Company's plant, Titusville, Pennsylvania. Address all inquiries to Allegany Refiners, Inc., Bolivar, New York.

FOR SALE: 1 Superior Heavy Duty Oil Engine, Horizontal Single Cylinder, 100 H.P., 235 R.P.M., with McCord Lubricator, water circulating pump. Weight 32,000 lbs. P. O. Box 1242, Great Falls, Montana.

DIESEL ENGINES

Large selection—All sizes and types. Generator units, marine engines, gasoline engines, auxiliaries—also boilers, steam engines, turbo generators.
Complete Information on Request

A. G. SCHOONMAKER COMPANY
45 Church Street New York, N. Y.
Phone—WOrth 2-0455

WANTED

ORGANIZED production service company desires additional lines for West Texas and New Mexico. Either sales or service items. Experienced field contact organization with excellent warehouse facilities. Address Box B-727, The Oil and Gas Journal, Tulsa, Okla.

LEGAL BLANKS

OIL FIELD LEGAL BLANKS

Leases, assignments, releases, township plat books, well records, etc. Request on your letterhead gets free catalog. Olds Press, 215 East Third St., Tulsa, Okla.

THE BURKHART LINE of Legal Blanks Since 1908. Oil-Gas and Business Forms for Mid-Cont. and Illinois Basin. Leases Rev. with Gov.'s Regulations. Catalog and Samples. Burkhart Ptg. & Sta. Co., 115 So. Cincinnati, Tulsa, Okla.

ROYALTIES

MAPS and reports on land or royalty anywhere in Texas or New Mexico. Very reasonable charges. Details on request. Royalty Owners Service, P.O. Box 1535, Fort Worth, Texas.

QUICK SALE—Last Chance: ⅛ or part Royalty under well spudding contract, Wilcox sand. Lease 140 acres, Section 22-10-5, Seminole County, perfect title, $100 per acre.

WILLIAM MADGETT, Owner
Aldridge Hotel, Shawnee, Oklahoma
Reference any bank.

LEASES AND DRILLING BLOCKS

NEW MEXICO
State Oil and Gas Leases
Forty acres and multiples thereof, in a new HoT spot, 23 oil companies own surrounding leases. Write for information. No obligation. HARRY S. WRIGHT, New Mexico State Lessee, Farmington, N. M.

5 OR 10 YEAR OIL AND GAS LEASES, TEXAS

2,000 acres S. E. Ward County.
3,000 acres Upton Co., near Crane.
1,292 Loving Co., near Winkler Co.
1,600 Terry Co., near Yoakum & Gains Cos.
1,520 Bowie Co., adj. Morris & Marion Cos.
134 Cass Co., 5½ mi. W. Linden in assembled block.
173 Rains Co., adjs. Van Zandt Co.
640 Webb Co., near Mirando.
MRS. WILLIE R. TIMMINS, OWNER FEE
4309 Stanhope Ave., Dallas, Texas, J8-7360

LARGE Independent Oil Company having Geoolgical and Geophysical department has several outstanding, approved drilling blocks which would farm out on fair basis to responsible parties. P.O. Box 1914, Fort Worth, Texas.

FOR SALE oil and gas leases on structure, or part furnished for drilling contracts, also proven tracts of fluorspar. W. P. Harley, Bowling Green, Ky.

HAVE you acreage with good geological data that you will give for a well. Prefer Kansas or Oklahoma shallow. Give full particulars first letter. I am ready to go. Box B-732, The Oil and Gas Journal, Tulsa, Oklahoma.

LEASES ROYALTIES

PRODUCING OR NONPRODUCING

Texas, New Mexico, Oklahoma, Louisiana and Illinois.

20 Years' Experience

Inquiries Invited.

B. D BUCKLEY
60 Broadview Drive, Clayton
St. Louis, Mo.

Representative Crude-Oil Prices

East Texas	$1.33
Conroe	1.43
Tepetate, Louisiana	1.18
Illinois basin	1.37
Pecos County, Texas	.98
Bradford, Pennsylvania	3.00
Van, Van Zandt County, Texas*	1.08

*No change since 5-21-41.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, General Land Office, District Land Office, Billings, Montana. Notice is hereby given that the lands herein described within the known geologic structure of the Elk Basin field, Montana and Wyoming, are offered to qualified bidders of the highest amounts offered per acre as a bonus for the privilege of leasing the land under section 17 of the leasing act, as amended by the act of August 21, 1935 (49 Stat. 674, 30 U. S. C. 226), at a sale to be held in the district land office at Billings, Montana, at 10 o'clock a.m. August 12, 1943, in the following parcels: Montana, M.M., Parcel No. 1, T. 9 S., R. 23 E., sec. 34, lot 8, sec. 36, lot 5. Wyoming, 6th P.M., Parcel No. 2, T. 58 N., R. 99 W., sec. 19, N½NW¼NW¼SE¼, E½NW¼SE¼, E½SW¼SE¼; Parcel No. 3, T. 58 N., R. 99 W., sec. 30, E½NE¼NW¼NE¼, NE¼SE¼NW¼NE¼, NW¼NE¼NE¼, W½SW¼NE¼NE¼, NE¼SW¼NE¼NE¼, E½E½NE¼, SE¼NW¼SE¼NE¼, SW¼SE¼NE¼, NW¼NE¼SE¼, E½E½SE¼, SW¼SE¼SE¼; Parcel No. 5, T. 58 N., R. 100 W., sec. 23, NE¼NW¼, W½SW¼NE¼SE¼, W½SE¼SE¼, S½NE¼SE¼SE¼, SE¼SE¼SE¼. Each successful bidder must deposit on the date of sale with the officer in charge of the sale a certified check on a solvent bank or cash for one-fifth of the amount bid by him and file the showing of qualifications to receive a lease required by section 7 of Circular 1386. The remainder of the bonus bid and the annual rental at the rate of $1 per acre must be paid and a $5,000 corporate surety bond must be furnished prior to the issuance of the lease. Bids may be submitted combining two or more parcels for the lands in Wyoming provided the aggregate acreage does not exceed 640 acres, the drilling, producing, rental and royalty requirements to apply separately to each parcel. Bidders are warned against violation of section 59, U. S. Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids in the discretion of the Secretary of the Interior.

Register

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, General Land Office, District Land Office, Cheyenne, Wyoming. Notice is hereby given that the lands herein described within the known geologic structure of the Buffalo Basin gas field, Wyoming, are offered to qualified bidders of the highest amounts offered per acre as a bonus for the privilege of leasing the land under section 17 of the leasing act, as amended by the act of August 21, 1935 (49 Stat. 674, 30 U. S. C. 226), at a sale to be held in the district land office at Cheyenne, Wyoming, at 10 a.m. on September 9, 1943, of the following parcels: Parcel No. 1, T. 47 N., R. 99 W., sec. 7, SW¼NE¼, W½SE¼; sec. 18, W½E½, E½SW¼; Parcel No. 2, T. 47 N., R. 99 W., sec. 19, lots 1, 2, W½NE¼, E½NW¼, T. 47 N., R. 100 W., sec. 24, E½NE¼, NW¼NE¼; Parcel No. 3, T. 47 N., R. 100 W., sec. 11, NE¼NW¼, E½SE¼, sec. 13, SW¼NW¼; Parcel No. 4, T. 48 N., R. 100 W., sec. 26, E½SW¼, sec. 27, NW¼NE¼, sec. 28, NE¼NE¼; Parcel No. 5, T. 48 N., R. 100 W., sec. 35, lots 1, 2, NW¼NE¼; Parcel No. 6, T. 48 N., R. 99 W., sec. 31, lot 4, T. 48 N., R. 100 W., sec. 36, lot 7. Each successful bidder must deposit on the date of sale, with the officer in charge of the sale, a certified check on a solvent bank or cash for one-fifth of the amount bid by him, and file the showing of qualifications to receive a lease required by section 7 of Circular 1386. The remainder of the bonus bid and the annual rental at the rate of $1 per acre must be paid and a $5,000 corporate surety bond must be furnished prior to the issuance of the lease. Each parcel will be offered for sale separately. The successful bidder of two or more parcels may consolidate them in a single lease if the total acreage does not exceed 640 acres, and may file a satisfactory collective bond. Bids may be submitted by mail provided they are accompanied by one-fifth of the bonus bid, and a showing of qualifications of the bidder. The envelope should be plainly marked for opening on the day and hour of the sale. Bidders are warned against violation of section 59, United States Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids in the discretion of the Secretary of the Interior. William G. Johnson, Register.

Journalisms:

WHEN cement placed behind a casing fails to perform its proper functions, the causes of failure are either created or are present during the drilling of a well. Usually enlargement of the hole is the principal obstacle to a satisfactory job, and it is possible that drilling holes to gage will be as important during the next decade as straight-hole drilling has been in recent years. An article by a staff writer next week will deal with the origin of many cementing failures. The author states that no tool, equipment, or method will ever provide a cure-all for cementing troubles, and asserts that the best that can be expected of any advancement or improvement is that it will be a contribution to solving the problem. In this practical discussion of the problem the author points out that immediate repair of a cement job as soon as it is evident that it is not a complete success is a frequently ignored principle.

PASSED by the censors, and awaiting publication in an early issue, is an article describing many of the interesting features of the cooperative project at Port Neches, Tex., which will manufacture 100,000 tons of butadiene per year, sufficient to make approximately 110,000 long tons of synthetic rubber, which is the equivalent of almost one-fifth of this country's prewar requirements. This capacity will rank it, on completion, as the largest unit in the world built solely for the manufacture of butadiene. An interesting sidelight on this plant is its utility requirements. One example is mentioned: the volume of cooling water to be taken from the Neches River, 310,000,000 gal. per day, is equivalent to one-third of the water consumption of New York City last year. You will be interested in reading about this and other features of this largest single project in the history of the refining industry.

THE series of articles on oil-well pumping practices, by J. Zaba, which got under way with the first issue of July, has elicited much interest on the part of our readers. Next week's installment will discuss well loads of a sucker-rod pumping installation. In formulas for calculation of loads, certain dimensional and other sucker-rod constants have to be used. The constants most often needed are shown in a table, while a chart is presented which can be used for conversion of well loads to corresponding stresses, in different sizes of sucker rods. The practical value of these discussions by one of the industry's best-qualified engineers increases as the series progresses. They are so arranged that each unit is complete in itself so that the reader can start at any point.

THE question is often asked as to how the weekly estimates of crude-oil production as compiled and published in the Journal compare with the official figures when they are released several weeks or months later. There was an answer to this question in last week's semiannual issue. The official production total for the first 6 months was 709,770,000 bbl. and our weekly estimates added together pointed to a production of 709,281,000 bbl. or 489,000 bbl. less, a difference of 0.6 per cent. Our cocky estimators are now wondering how the official estimators could be off that amount.

CALENDAR

September

AMERICAN CHEMICAL SOCIETY, petroleum division, fall meeting, September 6-10. Place not yet determined.

NATIONAL PETROLEUM ASSOCIATION, annual meeting, Waldorf-Astoria Hotel, New York City, September 21-22.

October

AMERICAN ASSOCIATION OF OILWELL DRILLING CONTRACTORS, third annual meeting, Houston, Tex., October 5-6.

AMERICAN GAS ASSOCIATION, twenty-fifth annual meeting, Jefferson Hotel, St. Louis, Mo., October 11-13.

MID-CONTINENT OIL AND GAS ASSOCIATION, annual meeting, Blackstone Hotel, Fort Worth, Tex., October 14-15.

INDEPENDENT PETROLEUM ASSOCIATION OF AMERICA annual meeting, Fort Worth, Tex., October 25-27.

November

AMERICAN PETROLEUM INSTITUTE, twenty-fourth annual meeting, Palmer House, Chicago, Ill., November 8-11.

December

NINETEENTH EXPOSITION OF CHEMICAL INDUSTRIES, Madison Square Garden, New York, December 6-11.

ADVERTISERS IN THIS ISSUE

Allis-Chalmers Mfg. Co.	4-5
American Cast Iron Pipe Company	59
American Meter Company	10
Axelson Manufacturing Company	38
B & W, Inc.	70
Bethlehem Steel Co.	1
Broderick & Bascom Rope Co.	53
Brown-Strauss Corp.	69
Buckeye Traction Ditcher Co.	65
Cameron Iron Works, Inc.	41
Chapman Valve Mfg. Co., The	51
Chicago Bridge & Iron Company	Inside Front Cover
Classified Advertising	85-86-87
Darling Valve & Mfg. Co.	58
Dresser Mfg. Co., The	8
Economy Electric Lantern Co.	63
Fluid Packed Pump Co.	7
Foreman Company, C. S.	65
Four Wheel Drive Auto Co.	2
Garlock Packing Company, The	56
Hanlon-Buchanan, Inc.	Front Cover
Hughes Tool Co.	Back Cover
Justrite Manufacturing Co.	58
Lone Star Cement Corporation	48
Lufkin Rule Co.	62
McCord Radiator & Mfg. Co.	65
McDermott, Inc., Tom P.	70
McNamar Boiler & Tank Co.	63
Macwhyte Co.	3
Magnetrol, Inc.	58
Martin-Decker Corp.	78
National Airoil Burner Co., Inc.	62
National Supply Co., The	46-47
National Transit Pump & Machine Co.	9
Oakite Products, Inc.	56
Oil Well Improvements Co.	81
Patterson-Ballagh Corporation	70
Petroleum Electric Power Association	75
Pipe Line Service Corp.	64
Plant Rubber & Asbestos Works	60
Reading-Pratt & Cady Division of American Chain & Cable Co.	6
R-S Products Corp.	71
Rector Well Equipment Co., Inc.	79
Schaub Engineering Co., Fred H.	58
Sharman and Allen	64
Smith Oil Tool Co., H. C.	70
Templeton, Kenly & Co.	78
Toledo Pipe Threading Machine Co., The	74
Tube-Turns, Inc.	83
Tuboscope	57
Universal Oil Products Co.	12
Visco Products Company	84
Wellman Co., The S. K.	42
Wheatley Pump & Valve Mfgrs.	85
Whitney Chain & Mfg. Co.	66
Youngstown Sheet & Tube Co.	Inside Back Cover